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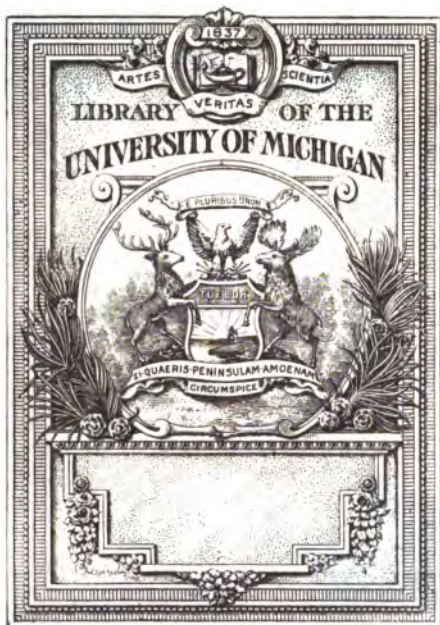
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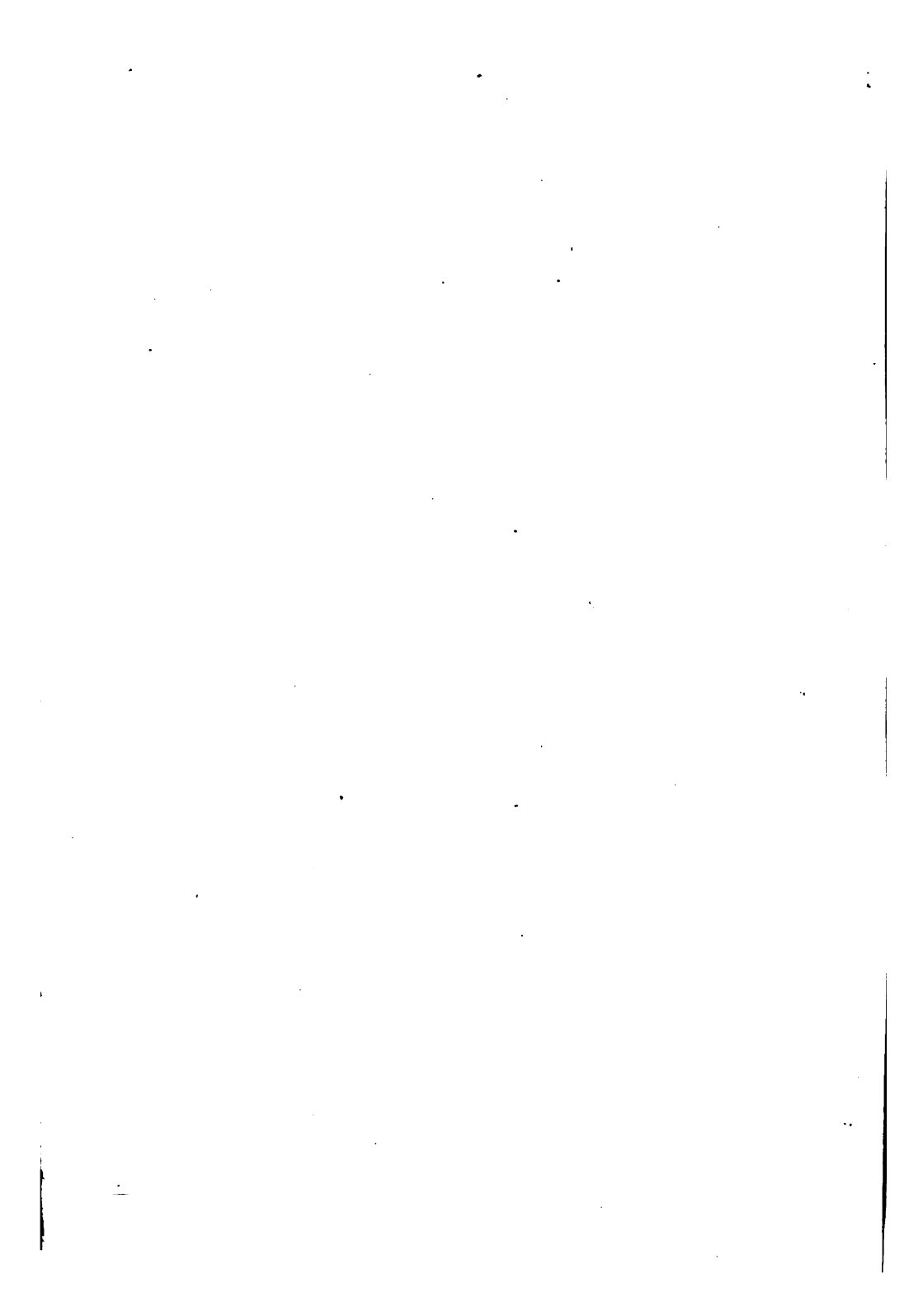
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**THE SMALL
COUNTRY PLACE**

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FIG. 1—A BEAUTIFUL COUNTRY HOME.

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THE SMALL COUNTRY PLACE

BY
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ONE HUNDRED ILLUSTRATIONS



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CONTENTS

CHAPTER I

THE SUBURBAN HOME.....	13
Advantages of Living in the Country; Farming and Gardening for Pleasure or as a Business; The Home Owner and Home Seeker; Where Shall We Look for New Homes? Important Points to Consider: 1. Healthful and Pleasant Surroundings; 2. Good Schools and Churches; 3. Congenial Social and Political Conditions; 4. Suitable Soil and Exposure; 5. Suitable Buildings; 6. What are the Markets? 7. Good Roads; 8. Is there Woodland on the Place? 9. The Capital Required. Summary.	

CHAPTER II

REMODELLING AND IMPROVING OLD BUILDINGS.....	31
First Make Buildings Healthful; Examine Sills; Roofs and Gutters; Shingles; Asphalt Roofing; Iron and Steel Roofing; Inside Conveniences; The Purity of the Water Supply; Sanitation; Improvement of Buildings; The Tool House; Farming Tools; Poultry Houses; Barn, Stable and Carriage House, etc.; Shingling Old Buildings; Painting Old Buildings; Time to Paint; Kinds of Paint; Brushes and Painting.	

CHAPTER III

BUILDING NEW HOUSES.....	52
--------------------------	----

28 36

PART I.

Building Associations; A Definite Plan; Contract and Day Labor; The Most Important Points: Location; An Abundance of Windows; The Water Supply; Houses of Wood; The Frame; Cover Boards; Shingles; Finish; Floor Boards; Finishing Floors.

PART II.

Brick, Stone and Cement Houses: Brick Houses; Houses of Stone; Cement Buildings; Solid Walls; The Block System; The Cement and Sand; Mixing Cement and Sand; Cement for Outbuildings; Cement for Floors and Walks; Heating Country Houses: Hot-Water Heat, Hot-Air Heat, Steam Heat.

CHAPTER IV

THE DECORATION OF HOME GROUNDS.....	73
Preserve all Naturally Beautiful Features; Time for Pruning Trees; Some of the Best Street and Avenue Trees; Home Decoration; Grading About the Building; Roads and Walks; Underdraining Road-bed; Concrete Drives and Walks; Planting Trees and Shrubs; Where to Obtain Ornamentals; Time for Planting; Planting Evergreens; Arrangement of Trees and Shrubs; Fruit Trees as Ornamentals; List of Trees; Ornamental Shrubs; Grouping Shrubs; Pruning Shrubs; List of Shrubs; Climbing Shrubs; Removing Walls and Fences.	

CHAPTER V

THE LAWN AND FLOWER GARDEN.....	98
The Lawn; Lawn Grasses; Time for Sowing Seed; Seeding Lawns; Weeds in Lawn; Water a Necessity; Improving Old Lawns; Lawn Mowers and Their Care; The Flower Garden; Cultivation of Wild Flowers; Lawn Perennials; Lawn Annuals and Bedding Plants; Biennials; Dutch Bulbs; Winter Protection for Hardy Plants; Window and Veranda Plants.	

CHAPTER VI

THE FAMILY GARDEN.....	117
Soil and Exposure; Mixed Planting; Plans of Gardens; Fruit Trees in Turf; Cultivation of the Family Garden; Summer Fertilization; Cold Frames and Hot-Beds; Starting Seeds; Poultry and the Family Garden.	

CHAPTER VII

FRUIT GROWING.....	130
Equipment Required; Fruit Growing as a Business; Best Soil for the Apple; Selection and Arrangement of Trees; Cultivation; A Cover Crop; Cost of an Apple Orchard; Apple Trees in Turf; Renovating Old Trees; Pruning Fruit Trees; Varieties; Harvesting the Apple Crop; Insect Pests; Dwarf Apples.	

CHAPTER VIII

THE PEARS, PEACHES, QUINCES, PLUMS, APRICOTS AND NECTARINES	156
The Pear: Kinds of Trees; Renovating Old Trees; Varieties; Harvesting the Fruit; Insects Injurious to the Pear; Fungous Pests. The Peach: Pruning for Planting; Marketing Peaches; Varieties of the Peach; Insects Injurious to the Peach; Fungous Pests. The Quince: Selection of Quince Trees; Marketing Quinces; Insects and Diseases. The Plum: Fungous Diseases of the Plum; Varieties; Marketing Plums. The Apricot: Varieties; Cultivation. The Nectarine: Cultivation; Varieties. The Cherry: Cultivation; Varieties; Marketing; Insect and Fungous Pests.	

CHAPTER IX

THE GRAPE.....	182
Propagation; Pruning; Cultivation and Fertilization; Varieties; Marketing; Girdling; Insect and Fungous Pests.	

CHAPTER X

THE BUSH FRUITS	198
Propagation of the Raspberry and the Blackberry; Cul- tivation; Insects and Diseases; Varieties. The Cur- rant: Propagation and Cultivation; Varieties; Insect and Fungous Pests. The Gooseberry: Cultivation; Varieties. The Strawberry: Methods of Planting; Winter Protection; Harvesting the Fruit; Varieties; Insect and Fungous Pests.	

CHAPTER XI

MARKET GARDENING..... 216

General Observations and Directions; Fitting the Land; Planting; Asparagus; Beans: Varieties; Beets: Varieties; Cabbages, Cauliflowers, Brussels Sprouts, etc.: Cultivation; Varieties; Carrots: Cultivation; Varieties; Celery: Cultivation; Varieties; Sweet Corn: Cultivation; Varieties; Lettuce: Cultivation; Varieties; Melons: Cultivation; Varieties; Onions: Cultivation; Varieties; Peas: Cultivation; Varieties; Potatoes: Cultivation; Varieties; Rhubarb; Squashes: Cultivation; Varieties; Tomatoes: Cultivation; Varieties; Turnips: Cultivation; Varieties.

CHAPTER XII

POULTRY KEEPING..... 241

General Observations and Directions; Location; Poultry Houses; Care of the Fowls; Raising Chickens; Feed; Production of Eggs; Roosts; Nests; Breeds of Poultry; Pigeons.

CHAPTER XIII

DAIRYING, THE FAMILY HORSE, AND BEES..... 257

General Observations; Milking; Keeping the Milk; Breeding; Dairying; The Milk Supply; Keeping up the Standard; Purity; Raising Calves; Selecting the Family Cow; The Family Horse; The Stable; Watering; Carriages and Harnesses; Bees: The Apiary; The Hives; Surplus Honey; Swarming.

CHAPTER XIV

MONTHLY CALENDAR..... 270

Directions for each Month's Work: The Land; Buildings; Stock; Roads and Walks; The Lawn; Trees and Shrubs; The Flower Garden; Greenhouses and Sash; The Vegetable Garden; The Vineyard; Small Fruits; Fertilizers; Seeds; Poultry; Bees, etc.

LIST OF ILLUSTRATIONS

	PAGE
Fig. 1 A Beautiful Country Home. <i>Frontispiece</i>	
Fig. 2 A Cottage Home Valued at \$1200	21
Fig. 3 A Cottage Home Valued at \$800	27
Fig. 4a A Cottage House Before Remodelling	33
Fig. 4b A Cottage House After Remodelling	33
Fig. 5 A Trap to Prevent Escape of Sewer Gas From Cesspools, etc.	37
Fig. 6 A Handy Tool-Room or Work-Shop	40
Fig. 7 The Tool-Room. Farm Tools Hung on the Walls of the Barn Basement	41
Fig. 8 A Modern Poultry House with Scratching Shed ..	43
Fig. 9 A Modern System of Ventilating Stables, Poultry Houses, etc.	45
Fig. 10 A Small Shingled Building Covered with Vines; Grapevine above, Nasturtiums below	46
Fig. 11 A Modern Shingled House	48
Fig. 12 A Brick House in the Country	59
Fig. 13 The Construction of a Solid-Wall Concrete House Reinforced by Steel Rods	62
Fig. 14 A Stone Cottage in the Country	63
Fig. 15 Section of a Concrete Fire-Proof House with Solid Walls, Reinforced with Steel Rods.	66
Fig. 16 A Cement Concrete House made of Hollow Blocks	67
Fig. 17 A Machine for Making Hollow Concrete Blocks ..	68
Fig. 18 A Tall Young Tree Showing Where to Cut to Make it Branch Low	74
Fig. 19 A Norway Spruce Tree With Leading Shoot Cut off to Force Growth into the Lower Branches	75
Fig. 20 The Result of Cutting off the Leading Shoot	75
Fig. 21 Forked Branch of Tree Broken Down by Ice, Repaired and Supported by Iron Rod	76
Fig. 22 A Perfect Purple-Leaf Beech Tree, the Result of a Good Soil, a Northern Exposure and Plenty of Room.	77
Fig. 23 The Location of Drives and Walks	80
Fig. 24 Another Plan of Drives and Walks	80

	PAGE
Fig. 25 How to Lay Out Drives and Walks	80
Fig. 26 Section of Road With Tile upon the Upper Side Only.....	81
Fig. 27 Section of Road With Drain Tile on Both Sides..	81
Fig. 28 Trees and Shrubs Appropriately Arranged on the Lawn and in Front of the Dwelling	91
Fig. 29 Low Shrubs Arranged in Front of the Tall Ones .	93
Fig. 30 A Beautiful Shingled Summer House	95
Fig. 31 A Rose-Covered Porch	96
Fig. 32 Just Coming From the Flower Garden.....	103
Fig. 33 Native Shrubs and Ferns Arranged With Build- ing for Background	107
Fig. 34 How Peony and Other Herbaceous Perennial Roots are Divided for Transplanting	110
Fig. 35 The Flower Garden; Bulbs in Bloom in Spring ..	111
Fig. 36 Plan of Garden and Grounds.....	119
Fig. 37 Plan of Garden of Fruit, Flowers and Vegetables	120
Fig. 38 Plan of Garden of Fruit and Vegetables.....	121
Fig. 39 Mixed Garden and Farm Crops.....	122
Fig. 40 The Author's "Weed-Killer." Note the Wheel Hoe, Triangular Hoe, Rakes of two Widths, etc..	124
Fig. 41 The Triangular Hoe; How Made	125
Fig. 42 Young Apple Trees: (a) No. 1, Two-Year-Old Tree Unpruned; (b), the Same After Pruning	137
Fig. 43 A Tall Apple Tree Before Pruning.....	142
Fig. 44 A Tall Apple Tree After Pruning	143
Fig. 45 A Tall Apple Tree at the End of the First Season After Pruning	144
Fig. 46 Grafting: How the Stock is Cut and Split.....	145
Fig. 47 Grafting: How the Scions are Cut	145
Fig. 48 Grafting: The Stock After the Wax Has Been Put On.....	146
Fig. 49 An Apple Tree One Year After Grafting	147
Fig. 50 An Apple Tree Three Years After Grafting	147
Fig. 51 An Old Orchard Pruned From Below Only	148
Fig. 52 An Old Orchard Before Pruning.....	148
Fig. 53 An Old Orchard After Pruning	149
Fig. 54 An Old Orchard the Autumn After Pruning	149
Fig. 55 A Perfectly Shaped Apple Tree, Produced by Cutting in the Tops	150
Fig. 56 A Convenient and Cheap Ladder for Working on Low Trees	155

LIST OF ILLUSTRATIONS

11

	PAGE
Fig. 57 A Three-Year-Old Peach Orchard in Summer Growth	162
Fig. 58 A Peach Tree Unpruned for Four Years	163
Fig. 59 A Four-Year-Old Peach Tree Before Pruning	164
Fig. 60 A Four-Year-Old Peach Tree After Pruning	164
Fig. 61 Pear and Quince Trees and Blackberries in the Poultry Yard	169
Fig. 62 Plum Trees over Thirty Years Old	173
Fig. 63 Currant Bushes under Plum and Apricot Trees ..	179
Fig. 64 A Small Vineyard.....	183
Fig. 65 Stable Ornamented by a Grapevine Fifty Years Old	185
Fig. 66 Single Grapevine Pruned and Fruiting; Cane Tied to the Top Wire	187
Fig. 67 A Single Vine with Fruit on Top Wire.....	188
Fig. 68 Grapevine in the Garden Unpruned for Five Years.....	189
Fig. 69 Grapevine in the Garden after Pruning	190
Fig. 70 Grapevine in the Garden in September. In full Foliage and Fruit.....	191
Fig. 71 Sprayed and Unsprayed Vines: First and Third Vines Sprayed; Second and Fourth Unsprayed	195
Fig. 72 Trellis with Cross Supports for Raspberry and Blackberry Canes	200
Fig. 73 Trellis Without Cross Supports.....	200
Fig. 74 Strawberry Plants in Hills	207
Fig. 75 Strawberry Field Planted in the Double Hedge-Row System	208
Fig. 76 The Strawberry Harvest	211
Fig. 77 The Hot-Bed; Note Sash, Mats and Shutters	218
Fig. 78 A Small Greenhouse	218
Fig. 79 Late Cabbages Following Strawberries. Blackberry Field in the Distance	224
Fig. 80 A Movable Summer Colony-House for About Fifteen Hens, or a Larger Number of Chickens. Open View	242
Fig. 81 Same as Fig. 80. Closed View.....	242
Fig. 82 Poultry in the Raspberry Patch	243
Fig. 83 A Modern Poultry House With Scratching Shed Between Two Pens.....	245

	PAGE
Fig. 84 A Model Incubator; One of the Necessities for Profitable Poultry Growing	248
Fig. 85 A Model Brooder. Where the Chickens are Kept After Being Taken From the Incubator ..	249
Fig. 86 Poultry in the Asparagus Field	251
Fig. 87 A Pigeon Loft	255
Fig. 88 The Family Cow	258
Fig. 89 The Family Horse	265
Fig. 90 A Modern Apiary	267
Fig. 91 January. After School and Before Chores	271
Fig. 92 Pruning From the Top Down	273
Fig. 93 February. Making Quick Work of the Wood-Pile	276
Fig. 94 March. Sugaring Scene in Vermont	281
Fig. 95 May. The Beginning of the Strawberry Crop ...	290
Fig. 96 July. Currants and Gooseberries Ripen This Month	297
Fig. 97 September. Harvesting the Grape Crop	304
Fig. 98 October. Sorting and Packing Apples	306
Fig. 99 November. Raising Turkeys Almost a Lost Art.	312
Fig. 100 December. A Christmas Tree	316

THE SMALL COUNTRY PLACE

CHAPTER I

THE SUBURBAN HOME ; ADVANTAGES OF LIVING IN THE COUNTRY

THE ideal place to live is in the country, even though one's business is in the city. In the country one is more independent, and free from much of the formalism and many of the whims of modern society; and may have elbow room, so to speak, with pure fresh air on every side, and quiet from the constant interruptions of the crowds encountered in a busy and bustling city. Too many of our people are crowded into the limited space of the cities and never see the broad and beautiful fields and wooded hills, or breathe the pure air that is laden with the rich perfume of the fields and woods. They know nothing of birds and flowers, the wonders of plant and animal life, or the broadening effect of daily contact with Nature in her various moods.

With the modern methods of travel one may live in the country and work or attend to an established business, often requiring but a few hours each day, and have the remaining time to devote to the garden, growing fruits or vegetables, caring for poultry, bees, etc. He can thus have an abundance of fresh fruit and vegetables, milk, poultry, eggs, etc., for his own table, the supply of neighbors, or the local market. A small garden skilfully cared for may be made to produce a won-

derful amount of fresh fruit and vegetables in such a condition as cannot be found in the local markets; and larger areas may be profitably planted if one has a little capital and becomes skilled in growing garden crops. One may keep the family cow and horse, too, as family pets, and the smaller pets (poultry, dog or cat), with both pleasure and profit.

There is no place like the country in which to bring up children. Everywhere about them are Nature's realities, not the narrow creations of man. They learn to take responsibilities, become self reliant by the care of the cow, the horse, and the chickens, and by working in the garden; and, best of all, they can be with father and mother, sharing with them the cares of the household, the sports of rural life, and the pleasures of home. They can have a workshop where they may gain skill in using hand and eye. In the summer they can have the sports of swimming and boating, and in winter coasting, skating, and snow-shoeing in the broad free expanse of hill and dale.

Where the area of land is sufficient, help may be employed in the garden. The man of all work, who must often be kept about the suburban home, may spend spare hours profitably in caring for the garden crops. Many a small village lot has been made to yield a considerable income from crops of lettuce, cucumbers, roses, carnations, violets, etc., grown under glass; and larger areas of only a few acres have produced income enough, from outdoor vegetables and fruits, to pay the necessary help and yield a good living to the owner.

The small farmer with a few acres feels the influence of modern methods, and farm life is shorn of many of the trials and social deprivations of a half century ago. Then the farmer worked alone, cultivating a small area of such crops as were needed for home consumption, see-

ing little of the world beyond the narrow circle about him, living in a barren little world of his own. Today he may know, by means of the daily paper and the telephone, what is taking place in the remotest parts of the earth; and the quick methods of travel enable him to mingle with the crowds of the metropolis for business or pleasure. By this association with men under a great variety of conditions and close contact with ever-changing Nature, he becomes a broader and more fully developed man than is possible for those who are confined to more routine work, doing the same task day by day, year in and year out.

FARMING AND GARDENING FOR PLEASURE OR AS A BUSINESS.

Farming or gardening as a business offers especial inducements at the present time. In no other country are there so many well-to-do people, and the consumption of choice fruits and vegetables is steadily increasing. We have the best home markets in the world, and other countries are calling for our surplus products. Choice fruits and vegetables and all dairy products are in demand at good prices, but the growers of these must compete more or less with the growers of countries where labor is cheap and conditions the most favorable. Tropical fruits and vegetables are being put into our markets in immense quantities, and unless we produce the finest qualities these will be used in preference to home products. If our people cannot obtain choice apples, grapes, strawberries, or other native fruits, they will buy bananas, pineapples, oranges, etc., which are sold in our markets at low prices.

With these cheap-labor competitors producing fruits and vegetables that come to our markets at all seasons of the year, our farmers need to put forth all their energy

and skill to put into the markets products that will be equal if not superior to those received from the South and other countries, often months after they are harvested. This we can do. There is no country in the world that can produce better fruits (large and small) and vegetables than ours, and most of our more perishable small fruits and vegetables can be put into the hands of the consumer in so much more perfect condition than those shipped from distant points, that choice home products are sure to be in demand at good prices. Even during the winter, at the North, we may successfully compete with tropical countries in producing, under glass, tomatoes, cucumbers, lettuce, and other hot-house products.

The small farm is often more profitable than a large one. Too many farmers are land poor, while many have made fortunes on a few acres.

The city man with his family, tired of the rush and fever of city life, may often find desired rest and an abundant support on the small farm, if he will give close attention to the work and carry it on upon the business principles in vogue in the large city enterprises in which he was only an insignificant part. While dependent upon his own efforts for support he is independent of rules and restraints of exacting employers whose main effort is to get as much as possible out of their employees for the smallest possible wage.

THE HOME OWNER AND HOME SEEKER.

The readers whom this book is intended to aid may be grouped into (1) those seeking new homes for health, pleasanter surroundings, and freedom from the rush and bustle of the city, and who may not be dependent upon the land for their support; (2) those who already own small places that they wish to improve and make more

profitable; and (3) those of both classes who are wholly dependent upon their crops for a livelihood.

To the home seeker who consults the lists of real estate agents or the advertising columns of the agricultural papers it would seem that almost every land-owner wanted to sell. The number of places thus offered for sale however is but a very small fraction of the desirable homes occupied by those who do not wish to sell. It is true that the rural population in many sections changes frequently, often by death of old residents, the younger members of the family having gone to seek their fortunes in cities, where large enterprises attract them. Some fail in their efforts for want of working capital or because of improperly directed labor, and try other fields of effort. Among the farms thus coming into the market, now and then may be found an ideal place, but the majority will require capital, and often long, hard work, to put them into comfortable and profitable condition. There are in almost every section of the country small places that will make good homes and may be improved so as to yield profitable returns, when conducted on intelligent business principles.

WHERE SHALL WE LOOK FOR NEW HOMES?

Temperament, health and individual taste must determine whether one should locate North or South, East or West. For each location superior advantages will be claimed, but there are in every section some special conditions which the home seeker should consider. Points that should have special attention wherever we locate are:

1. Healthful and pleasant surroundings.
2. Good schools and churches.
3. Congenial social and political conditions.
4. Soil and exposure suited to the business to be followed.

5. Suitable buildings.
6. Accessible markets.
7. Good roads and facilities for transporting produce and getting to and from centres of business with which one must keep in touch for the greatest success.
8. Is there woodland on the place?
9. Capital required for our enterprises.

1. Healthful and Pleasant Surroundings.

The most important question to be answered in looking for a home in the country is, are there any unhealthful conditions either about or near the building? Without healthful surroundings one can hardly expect good health, without which few will be successful in business or take much pleasure in life. The house and stable cellars should be carefully inspected. If the soil about them is springy, tile drains should be laid so as to carry off all water that otherwise would settle into the cellars. The location of the stable cellar, yard, or cesspools, etc., as related to the water supply must be studied. If within two hundred feet, or in some cases even further away, the surface water will certainly settle into these deep basins, and become foul and a menace to health. The water from long-established wells, even in the country, is often more dangerous than that from those more recently made in more thickly settled sections. The safest water for family use is that from well aerated basins, or from rain-water from the roof after being filtered through brick or sand. Deep driven wells generally supply water free from objectionable organic matter, but may contain mineral elements that make the water hard or more or less unhealthful. From whatever source the water supply comes, the only way to be sure of its purity and healthfulness is to have samples analyzed by some board of health or experiment station, of which there is one or

more in every state, where such work is done at a nominal cost.

High elevations, where there is good drainage of the surface water away from the buildings, should be looked for, and yet in northern sections the buildings should if possible be sheltered by windbreaks of hills or trees from north and east winds. While the mercury will not go as low upon hills of moderate height as in the valleys, moving air is more uncomfortable than still air. Many crops, too, succeed better when in full exposure to air and sunlight on our small hills. Low malarial locations, near stagnant streams and pools, should be avoided, for no diseases are more insidious and difficult to cure than the germ diseases contracted in such localities.

2. Are There Good Schools and Churches?

In selecting a home, I shall place good schools and churches next in importance to healthful surroundings. In these days of business strife and competition no one can expect to be successful in the highest degree without at least a fair education; and apart from its bearing on business success or failure, the educated man or woman can enjoy more, and be able to do more good to those about them, than the uneducated. Wherever we find good schools, we find intelligent and peace-loving citizens. Churches, too, are a good index of the moral conditions of any community. While all church-goers are not always above reproach in their dealings with their fellow-men, the average standard of a church-going community is far above that of the non-church goers, and the habit of setting apart one day each week for attendance upon divine worship, and for home recreation with one's family, cannot be too earnestly urged. The moral character and thrift of a community should be fully studied. Industrious people are as a rule peaceable and contented,

and those who have their time well occupied with their own affairs have little time in which to make trouble for others. A community of thrifty people should be selected if possible. Wasteful people soon come to want, and this often leads to social disorders of many kinds.

3. *A Congenial Social and Political Community Desirable.*

Man is naturally a social being and needs the association of his fellows in order to reach his fullest development. In an uncongenial community one is inclined to draw within oneself, which soon leads to egotistical and narrow views of life. While much can be done by precept and by personal example toward improving social conditions, such efforts are likely to be more fruitful and life is much more enjoyable in a community where the majority are in sympathy with each other and united in their efforts to promote the general welfare. In union of effort there is strength.

4. *What is the Land Suited to Grow?*

Before we start out in our efforts to improve the farm, we must first decide what lines of agriculture or horticulture we are best qualified to follow, and what the land is best suited to produce. The margin for profit in growing any of the farm or garden crops is very small, and unless the soil and other conditions are favorable, and the work be skilfully done, there is sure to be little profit if not actual loss. If we decide to grow fruits, and wish land suited for them, we would select rather heavy moist land—good grass land—for the apples, pears, currants, raspberries and blackberries. The vegetables that succeed upon this kind of land are cabbages, cauliflower, celery, etc. Light, medium loamy soil, with a southern exposure, is well adapted to the growth of

small fruits, grapes, peaches, early vegetables of all kinds, melons, squashes, and poultry. Very thin light soil may be useful for crops that mature early, before the usual droughty season comes on, like asparagus, beets, beans, early lettuce, etc. A northern slope, if in full exposure to sunlight and air, is well suited to the growth of apples, peaches, late strawberries, raspberries and blackberries, cabbages, turnips, dandelions, etc. The



FIG. 2—A Cottage Home, after Remodelling. Valued at \$1200.

greatest possibilities of any piece of land cannot certainly be determined by examination, and as much as possible concerning its production for the past three or four years should be learned from the previous owner or from the neighbors. It may require several years with trial crops to determine its adaptability, and it is best therefore at first not to risk large areas in experimental crops. We may generally expect, however, by the liberal application of stable manure and other fertilizers,

and thorough and constant tillage, that paying crops may be grown. It must be borne in mind that in taking up a new business, or in changing methods or location, some time may elapse before all of the conditions for success are mastered. This is especially the case with lines of agriculture and horticulture, where our capital can be turned and where we can see and profit by the results of a trial of any variety or method but once in a year. The success of a crop the first year will also depend much upon what crop was grown upon the land the previous year, and perhaps for a series of three or four years.

5. *What Buildings Must We Have?*

Buildings are the most expensive part of the equipment of the country home or small farm, and the number and size of the buildings needed for the business in hand will depend largely upon the size of the family and the amount of land to be cultivated. If our means are limited, we cannot afford large and costly buildings and a few good, well-lighted and healthful rooms that can be made comfortable in all weathers will suffice to start with. A small dwelling-house and small outbuildings with some space between them, to which additions can be made as the business or other conditions require, are better to start with than large buildings that must be cared for and continually kept in repair. If possible all the rooms in the house should have the sun some portion of the day, especially the living and sleeping rooms. If we are purchasing a home, we must carefully inspect the foundation and sills, for many buildings that are apparently sound upon the outside, will be found in a sad state of decay under the sheathing or finish inside, which will lead to no end of trouble and expense. Examine the chimneys carefully, for in old buildings there

are often openings between the bricks, where the mortar has fallen out, endangering the wood-work near should the accumulating soot take fire. A large proportion of country fires are due to defective flues. One should select buildings, if possible, with the sills well up from the ground upon good underpinning of stone or brick. This ensures the sills from decay and allows for good ventilation of the cellar. Enough stable room and out-buildings should be provided to properly protect all animals and tools from the weather. By a systematic arrangement a large number of tools may be kept within a small space. More of our agricultural tools rust out than wear out. Rapid and good work cannot be done with rusty tools.

6. *What Are the Markets?*

To grow a crop successfully and cheaply, and be able to sell it to the best advantage, requires talents possessed by but few individuals. The market where produce may be sold should be carefully investigated. If within teaming distance, or where express trains run frequently, one may look for good prices for choice products, while small markets soon become glutted and prices will be low, even for the best. The business of supplying the non-producing population with fruit and vegetables has changed greatly in the last two decades. Few families now lay in a supply of these articles for winter's use, but depend upon the peddler or the retail grocer for their needs from day to day. Instead of buying a bushel of potatoes, beets, or turnips, a barrel of apples, etc., they buy in much smaller quantities. To supply the consumer in this manner requires the grower either to "peddle" or to sell his products to those who are in the retail or peddling business. If he sells to the peddler, he must be satisfied to give him a large per cent. of profit.

If he peddles, he must give up a large amount of time that is valuable in growing the crops, and it is very difficult to hire men who will do either the garden work or the peddling well, except under the eye of the owner.

There is at the present time a tendency in all lines of business to combine producing large quantities or cultivating large areas under one management. The small farmer is not exempt from this necessity of combining with others to obtain the greatest profit, but by doing his own work largely and supplying the consumer at first hand he may retain his independence and receive reasonable compensation for his labor. By coöperation in the purchase and use of modern machinery, fertilizers, and supplies, the protection of crops from insects and fungous pests, the small farmers may be more successful financially and still be men of broad and varied training and not the narrow, mere machines which those who work for large corporations are likely to become. Specializing in farming is as much a necessity as in other callings, for the best results. The man who devotes his whole time to growing asparagus, strawberries, or apples, will be sure to grow a better product than if a large number of crops are grown, but he runs the risk of losing all by the destruction of the crop by insects, frosts, or unfavorable weather. We should have one or more *sure* money crops and take our chances with two or three more that under favorable conditions, prompt effort and skill on our part are generally profitable. Thus asparagus, apples, and strawberries are reasonably sure to be profitable under fair treatment, while peaches, grapes, celery, squashes, etc., are more dependent upon weather conditions and may sometimes fail even with our best efforts.

A location near markets has many advantages. If within easy driving distance one can be frequently in the markets, keep their condition closely in mind and sell

or hold as supply or prices may render advisable. The cost of teaming our products, if the distance be not great, may be reduced to the minimum by taking return loads of stable manure or other supplies back to the farm with little or no loss of time.

On the other hand land is more expensive in locations near the markets. If one is on a good line of railroad where trains run frequently and freight and express rates are not excessive he can often send heavy produce long distances by rail cheaper than by team. The close communication with the markets is, however, lost and he is dependent upon the commission man or the market reports.

7. Are the Roads Good?

Much of success in business and comfort of living in the country depends upon good roads. If we are a considerable distance from post-office, stores, schools, churches, etc., good roads will help wonderfully in the travel to and from them. If we must take our produce a long distance to market or to the railroad station, good roads will reduce the wear and tear of wagons, horses, and harness, and consequently the cost of getting it to market. If one is located on a line of state or macadam road he will find it smooth and passable at all seasons of the year, while the ordinary country road is often impassable for heavy loads in the winter or spring. Good roads cannot be made without good road material. If there is only sand or clay with which to build roads they will be poor and only small loads can be drawn over them. Nor can a good road be made upon land saturated with water without first under-draining the road-bed. Furthermore, the surface should be crowned at least two inches to the foot, and the poorer the material the greater must be this crowning. If roads are hollowed

out in the middle water will stand in these depressions and the road material will be rapidly worn to dust which will fly to every one's discomfort during dry, hot weather or to mud in the rainy season. In northern sections if possible we should locate on roads where the snow does not drift badly in the winter, making it difficult or impossible to get out without much hard work after heavy storms.

In many sections trolley lines are carrying farm produce to market or to the steam roads whence it goes to market to be sold by one's representative or by the commission man. This method of disposing of our farm products has not become as general as it should. Trolley lines should be compelled to give the people better facilities than they now enjoy in compensation for the almost unlimited privileges granted them.

8. Is There Woodland on the Place ?

In these days, when timber is being used up so rapidly, the supply is fast decreasing and the price is going higher every year, it is a great advantage to have a wood-lot or timber trees upon the place. We must have more or less wood for our fires, and lumber for repairs for fences even upon the smallest place, and many devices and conveniences, and a small area properly cared for will supply a large number of these wants. Then a grove or "woody" place where we may take a stroll in perfect quiet, or with the family or friends, is one of the greatest luxuries of country life. As a rule woodland is not held at high prices in most country districts. It may be purchased at from \$10 to \$50 per acre according to the amount of wood and lumber upon it. If located upon the north or west of the building the force of prevailing cold winds will be broken and the place be much more comfortable.

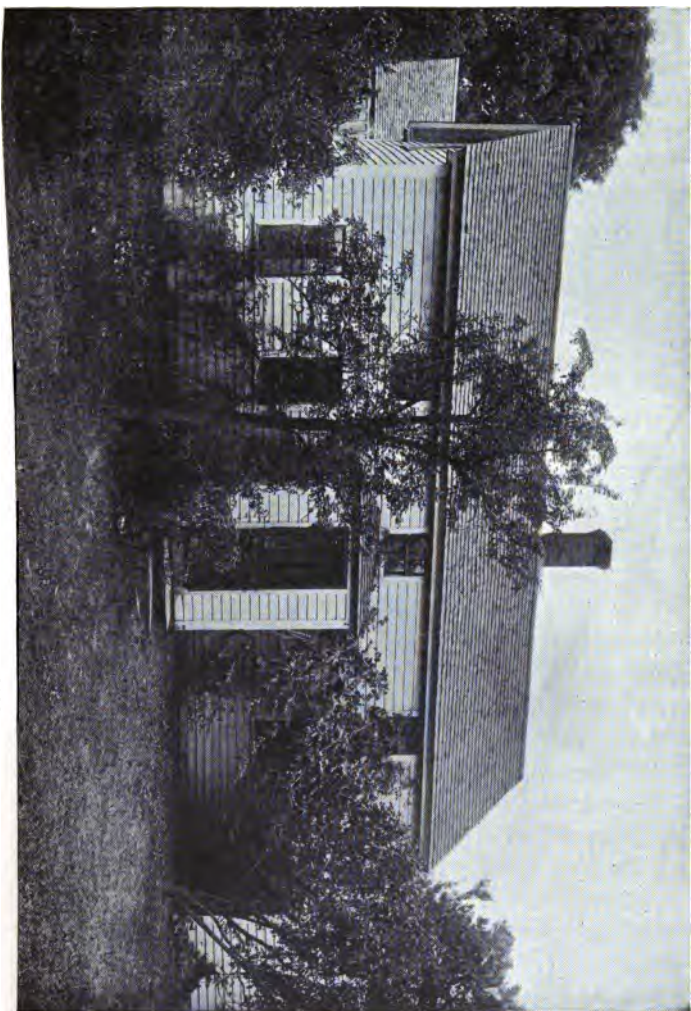


FIG. 3—A COTTAGE HOME. VALUED AT \$800.

1900

9. The Capital Required.

One can hardly expect to go into the business of running even a small farm without some capital, either in ready cash, a place well equipped with tools and supplies, or a large amount of health and vigor to put into the production of crops that shall early yield an income for the support of the family and to pay any interest and the taxes that are inevitable. The amount of capital needed will depend upon what are the prospects for an income early in the season, from poultry, asparagus, strawberries, or other sources that yield returns before the main crops mature, and what expenses must be met for the family, for fertilizers, labor, grain, tools, etc. With a farm owned or rented, a capital of from a few hundred dollars to perhaps one thousand dollars may be needed, according to the above conditions. By the neighborly exchange of labor and use of tools the cost of equipment may be much reduced, but it is much more satisfactory for each farmer to own all ordinary tools and machines, that he may be able to use them whenever needed without inconveniencing any one. Careful accounts should be kept from the first, and if possible nothing should be purchased until the money is in hand, to pay for it. With all the risks and chances with pests and wind and weather, this is the only safe course until we have something laid aside upon which to draw for investment or for increase of business.

SUMMARY.

With all the foregoing points in mind, those who plan to purchase or rent new places should begin a systematic and persistent search, looking over lists of real-estate agents, inquiring of friends, and using every means possible until the right place is found. This may be

"early in the game," or we may have to look about for weeks or months. One would hardly expect to find everything desired ready-made for him. The land may be just to our ideas but the buildings in a decayed or unsatisfactory condition; or the buildings may be just what we want but the land not quite right as to exposure or soil, with too many large rocks or boulders upon it, or it may be in an exhausted condition from neglect. As it is the land from which we are to obtain our income, those who are dependent upon it wholly for support must give this the closest attention. If the land is simply run down from neglect, but of naturally good quality, we may renovate it at small expense. If very uneven or full of large rocks it will require much expense to take out the rocks and put it in good condition to cultivate profitably. Small farms of from five to ten acres may often be found in desirable locations at from \$1,000 to \$3,000, in many cases for less than the value of building at the present prices of lumber and labor. Fig. 1 (Frontispiece) shows a place valued at \$3,500, Fig. 2 one at \$1,200, and Fig. 3 one valued at \$800.

Farm property located not too far from railroads is considered good for investments and if one has not much capital a good place may be mortgaged for one-half to two-thirds value.

CHAPTER II

REMODELLING AND IMPROVING OLD BUILDINGS

THE owner of a small farm will find that whether he has occupied it a long time or has just purchased it and is about to make a new departure in his business, more or less changing, repairing and improving will be needed. If one is not familiar with this kind of work an expert should be consulted. Fig. 4a shows a house before remodelling. Fig. 4b the same after changes are completed.

Utilize all Old Material.

With the high price of lumber, which is rapidly increasing, every one should make the most of what good material there may be in old buildings upon the place before building new ones. There are a great many old buildings which may be repaired for much less than new ones would cost, and when these are not worth repairing much of the lumber may be used in other buildings. This may be rough and more or less full of nails, and carpenters do not like to work it over with nice tools, but with the ordinary tools that one should keep for such work it may be sorted out and cleaned up at odd times so as not to cost as much as new lumber. It is on the ground, no money need be paid for it, there is so much good material saved to the world, and perhaps best of all, an unsightly object is obliterated or changed into something of utility and possibly of beauty. The frames of most old buildings are very heavy, many of

the posts and plates being large enough for sills of modern buildings, while rafters are large enough for posts and plates. It is thoroughly seasoned and when fitted in place will be less liable to warp than new lumber.

First Make Buildings and Surroundings Healthful.

As when deciding about the location and surroundings of the house, the healthfulness in and about old buildings is by far more important than any other consideration. Search should be made from cellar to attic, through and about every building, for anything that would possibly produce unhealthful conditions. Begin with the cellars. See that surface water or that from springs does not run in through the walls, making it damp and malarial. See that the water supply for the house and stable has not become contaminated by drainage from the cesspool, sink or stable.

Examine the Sills.

About the first thing to need renewing, especially when the buildings are set low, are the sills, and these are often the most costly to repair. As soon as the foundation begins to settle or the sills become soft, there is a settling of the frame above, the windows and doors become tight, the walls crack and soon extensive repairs may have to be made. At the first indication of this, jack-screws should be put under, these parts raised into place and substantially supported. All foundation walls, piers, or other supports should be laid below frost line, which will vary in different sections from two to four feet. A "stitch in time" will often save much loss and sometimes prevent serious accidents. The best material for sills where exposed to much wet or in poorly ventilated places is chestnut or cypress. Should the build-



FIG. 4a—A COTTAGE HOUSE BEFORE REMODELLING.



FIG. 4b—A COTTAGE HOUSE AFTER REMODELLING.

1800

ing be set low, so that the sills are constantly wet, it might be economy to raise the whole building to a foundation a foot or two higher and put in windows, so that the inside sills and floor timbers may be kept dry, under which condition they will not decay any more rapidly than other parts of the frame.

Roofs and Gutters.

Next after the foundation and sills the roofs should have attention; in fact, no part of a building will last long under a leaky roof. If the leaky condition is due to decayed shingles they should be replaced by new or some of the asphalt roofing materials, many of which if carefully laid, the joints well cemented, and afterwards given a coat of asphalt every two or three years, will last a long time. Good clear butts spruce shingles are perhaps cheaper in the end than these roofing materials, but the first cost is more and more skilled laborers are needed to put them on. Roof gutters and spaces about chimneys should have careful attention and tin, lead, or asphalt roofing, well cemented, be laid so wide, that the water will not set back and run through to the rooms below. To prevent water from setting back from the eaves during severe cold weather in winter, two or three thicknesses of ordinary building paper should be laid under the shingles, or other roofing material. Where warmth in the rooms immediately under the roof is desired, building paper should first be laid. Many poultry-houses are built with side walls well lined with paper and then shingled, while the roof (the most exposed part) is shingled upon only open jointed boards, the cold dropping quickly to the floor, and no amount of side covering will make them warm.

Slate Shingles.

If one can afford the expense, slate shingles are more durable and cheaper in the end if well laid. It is the practice in some localities to lay slate shingles over old wood shingles. If the latter are fairly good and all in place this makes a much warmer roof, and is to be recommended. Should the old lining-boards be rough and uneven when the old shingles are removed, two thicknesses of ordinary building paper will enable slate shingles to be safely laid.

Iron and Steel Roofing.

Iron and steel roofing materials are being offered at a very low price, but most of them last only a short time, rusting out quickly when exposed to the weather. If these roofings are thoroughly painted on the under side before laying and given a heavy coat of paint on the outside every two or three years they make a fairly satisfactory roof.

Heavy tin and thickly galvanized iron or steel make more serviceable roofs than the above.

Inside Conveniences; Water.

Nothing adds so much to the economy of housework and comfortable living as an abundance of water, supplied without the labor of pumping or carrying it. Running water from springs or some town or city supply is the most satisfactory. When this is not available, the supply may be forced into an elevated tank by windmill, ram or gasoline engine. When there is a never-failing small stream with sufficient fall the hydraulic ram is very satisfactory.

For many years past windmills have been largely used to force water into the supply-tanks, but most of

them are likely to soon wear out or get out of order, being exposed to high winds and gales, and they are now being replaced by gasoline or hot-air engines; when an engine is properly installed, well protected, and carefully used, it will last a long time and the water supply is insured whether the wind blows or not.

Purity of the Water.

Town and city water supplies are generally carefully inspected by local authorities or state officials and are safer than water from local wells or basins. Before any water supply is used freely it should be carefully inspected and if any doubt exists as to its purity samples should be sent to experiment stations, state boards of health, or other authorities whose duty it is to analyze such supply.

Bath-rooms, hot and cold water, and water-closets should be put into every country home, wherever possible. These can be arranged in a small space, and if the water cannot be supplied in any other way, a good force-pump will do the work of supplying the tank in the attic in an hour or two each day. A very small expenditure for so great a luxury.

Sanitation.

Wherever waste water is carried into cesspools or vaults the pipes must be provided with proper traps and escapes to prevent the gas from these places from entering the buildings (Fig. 5). All traps should be placed where they may be easily gotten at and cleaned out in case of stoppage, and where they will not freeze in

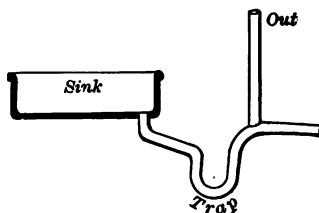


FIG. 5—A Trap to Prevent Escape of Sewer Gas from Cesspools, Etc.

severe weather. If a very large amount of foul matter is going through the trap it will soon become unsafe and should be cleaned at short intervals. A vent-pipe for the escape of gases from below the trap should be put in, in all cases. Cisterns and cesspools should be cleaned out at least once each year and the latter more frequently if necessary. Where the cesspool is in springy soil an overflow pipe should be put in a little below this pipe so that the flow into it may not become clogged with solid matter which generally rises to the surface.

BAY AND DORMER WINDOWS, PORCHES, VERANDAS, PIAZZAS, ETC.

Many old country houses have been very much improved and beautified by some of the above-mentioned features. Thus a dark, poorly lighted room may often be made light and sunny by the addition of a projecting or bay window from the side or end. If upon the north, the projection may be such as to catch the sun's rays morning and evening. If upon the south, and the space is not otherwise needed, it may serve as a conservatory where the house plants can be cared for with but little effort. Dormer windows may often be put into the roof (see Fig. 2) in such a way as to make additional rooms in the attic that are well lighted and sunny. Covered porches and storm-doors add much to the comfort of the family in stormy weather and may be made to add beauty to the house as well.

Piazzas and verandas are often a great luxury. On the north in summer and the south side in the winter they afford quiet resting-places for invalids or those wearied by toil of any kind. These need not be expensive structures. A simple, light, but strong frame covered with sound boards and tin planed and beaded on the under side so that they may be neatly

painted will suffice. If given but a slight pitch and covered with heavy tin laid flat this will make sufficient cover for the floor below and serve as the floor of a balcony above. The heavy verandas and piazzas built to many of our dwellings often overbalance the rest of the structure and add to its cost more than is warranted. The open veranda or platform over which an awning is placed (see Fig. 2) in the summer and in stormy weather has the advantage that the windows opening out upon it need not be shaded unless desired, and in pleasant weather one may be out in full exposure to sunlight and air. The shingled veranda adds much of beauty and comfort to old country houses.

REPAIRS OF OUTBUILDINGS.

The wood-shed, storage-room and tool-rooms are perhaps of next importance. Besides storing a sufficient supply of wood for the year, the shed should be large enough to comfortably store many of the appliances of the kitchen and laundry—the forms upon which the wash-tubs stand, the clothes-horse, baskets, etc., and perhaps the wheelbarrow, baby carriage, bicycles, and numerous other articles, needed for the comfort of the family. Wherever these things are stored, each should have a place, and every member of the family should be expected to return each to its place after using. By a series of pegs, or hooks and a shelf or two, a large number of small articles may be hung or put away where they are in sight and easily reached.

The Tool-House.

Whether we are farming or gardening on a small or large scale, a more or less large equipment of tools is needed for successful and profitable work, both for outside work and under cover on stormy days and during

the winter. The most successful farmers or gardeners are handy men, able to turn their hands to many kinds of work, and not always dependent upon the mechanics in the town or city, which may be several miles away, often taking more time to go and return with a job than to do the work oneself. A small kit of tools for iron working, and wood working, a supply of bolts, nuts, screws, nails, etc., that cost but a few dollars, will often save all they cost in repairing but a few articles.



FIG. 6—A Handy Tool-Room or Work-Shop.

To make the most of such an equipment one must know how to care for them, be more or less skilful in their use, and have them systematically arranged where they may always be found when wanted. Sets of wrenches, cold chisels, bits, drills, and other tools should be compactly placed in racks or drawers where they may almost be found with the eyes closed (Fig. 6). Different kinds of woods, boards, mouldings, etc., should

be placed in racks upon the ceiling or under the bench. A wooden vise attached to a substantial bench is needed for wood working and an iron one with an anvil attachment will be found most useful. If one has a large equipment of teams and tools, a portable forge, a few plumbing tools, taps and dies, etc., will save many a large bill.

Care of Farming and Gardening Tools.

The good workman is known by his tools, and no workman can do his best with poor tools or those badly



FIG. 7—The Tool-Room. Farm Tools Hung on the Walls of the Barn Basement.

cared for. All tools should be cleaned and wiped after using and hung in their proper places. A large number of tools may be kept in a very small space when properly arranged. The large tools like mowing-machines, horse-rakes, etc., will require considerable floor room, but the plows, cultivators, seed-sowers, weeders, etc., may be hung upon pegs or large hooks along the sides of the tool- or wagon-shed or cellar, as shown in the

illustration (Fig. 7). Chains, whiffletrees, eveners, etc., may be disposed of in the same manner, when they may be quickly taken down for use or an inventory taken at a glance to tell whether any have been left out or been borrowed by neighbors. Spades, shovels, forks, rakes, hoes, etc., may be hung in a still more compact manner upon racks, either home-made or the neat cast-iron ones offered by dealers.

Mark all Tools.

Nothing gives one more trouble than lending tools in the busy season, and while we all like to be neighborly, many borrowers are so forgetful that we often reach the state of declining to lend to any one. However, as we at times find it necessary to ask favors of neighbors, and we should all "give and take," we may get over the difficulty somewhat by having every tool distinctly marked or branded with our name. As it is very desirable to have the wood-work of all tools covered with oil or paint, if we adopt some distinctive color and in addition to branding paint all wood-work every two or three years with our special color, we can recognize our tools at a long distance and easily keep them at home.

Have a Warm Tool-Room.

A room that can be warmed is almost a necessity where repairs of tools, harness, market boxes, berry crates, etc., can be comfortably made in stormy weather and during the winter. The room should be dry, and when the weather is very moist and warm outside and cold inside, the doors and windows must be kept closed or the moisture will be condensed upon the tools, causing them to rust badly. In the fall, while the tools are bright, if covered with a thin coating of linseed oil they will be protected from rusting.

Poultry Houses.

Raising poultry is one of the largest interests on most small farms, and one in which cheap buildings if warm and dry are often as serviceable as more costly ones. An abundance of sunlight, warmth, and air must be provided. The first must be provided by a large glass surface on the south side. Second-hand window-sash or hot-bed sash may often be purchased for about the value of the glass in them, and if the frames are not badly de-



FIG. 8—A Modern Poultry-House with Scratching Shed.

cayed, by removing the glass, cleaning off the putty and thoroughly saturating the joints with thin paint, using a little kerosene in it, they may be made almost as good as new. Double sash will be economical during the winter if ventilators are provided for a sufficient supply of fresh air during the middle of the day and in warm weather (Fig. 8). Thin cotton cloth is now coming into use in place of glass as shown in the lower sash. It affords more protection from cold than glass, and prevents drafts when it is necessary to open on warm days.

Warm Houses.

There is little danger of getting old houses too warm if scratching-sheds are provided. There will always be more or less cracks and holes through which cold air will come. Old houses can be made warm by the use of building paper and banking about the foundation with old hay or straw. Tarred paper is largely used, as it is antiseptic and a partial insecticide, though not as warm as untarred or felt paper. The lining-boards between the rafters should be covered as well as the sides of the building, for no matter how warm the sides are made, the houses will be cold and damp from the cold air dropping down from this exposed surface. If there is no floor in the house, the ground outside for three or four feet should be covered with enough hay, straw or leaves to prevent its freezing, for without this covering the frost might work into the soil inside, no matter how warm the sides and roof are made.

Barn, Stable, and Carriage-House.

What has been said of the foundation, sills, roof, etc., of other buildings applies equally well to these structures. Whenever possible changes should be made to improve the conveniences for caring for stock and comfort of the same, storing fodder, and the disposal of the manure, etc. The latter should be disposed of in such a manner that the gases shall not rise into the stable or carriage-room. If it is dropped into the cellar below an abundance of absorbent material must be used, and windows made through the under-pinning on three or four sides. The best disposition that can be made of this material is to either put it on the land as made or dump it into a covered watertight pit, with all waste

matter from lawn, house, or garden, and keep it well covered with fine soil or other absorbents. It is surprising how much rich compost can be made from one or two animals or even from more in this manner, and the abundance of vegetables and fruit this compost will enable us to grow.

Cheap buildings may be made tight and warm in the manner described for poultry-houses. A very neat appearance will be produced upon the sides, if heavy roofing paper is used, with vertical strips or battens placed neatly about one foot apart, and then all painted. Horses and cows need a warm dry place with an abun-

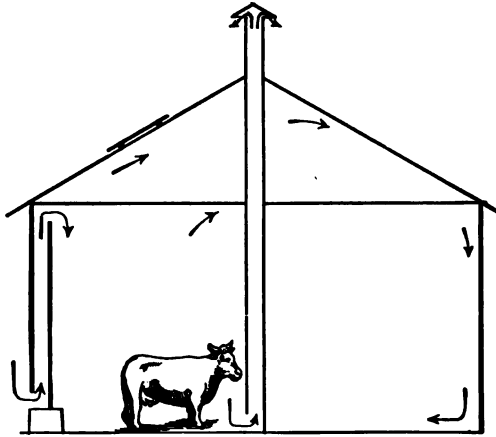


FIG. 9.—A Modern System of Ventilating Stables, Poultry-Houses, Etc.

dance of sunlight and air. One of the most approved methods of ventilating stables or poultry buildings is to have the fresh air come in from the outside at the sills, entering the stable under the upper floor, and the foul air passing into a shaft near the floor somewhere in front of the animals on a level with the floor (Fig. 9).

One inlet 4 x 20 inches to each ten feet of length will be sufficient for a small number of animals, with an exit shaft from one to two feet square, according to the number of animals.

SHINGLING WALLS OF OLD BUILDINGS.

Many old buildings have become unsightly from the starting and working off of the clapboards, which it is found difficult to hold in place with anything but large



FIG. 10—A Small Shingled Building Covered with Vines;
Grapevine above, Nasturtiums below.

nails that often crack them, increasing the unsightliness. Such walls may be covered with shingles, first removing the clapboards and putting on over the lining-boards one or two thicknesses of building paper, making very warm and neat buildings. The cost of first quality shingles and clapboards is about the same per square (100 sq. ft. 10 x 10 ft.) when the former are laid four inches to the weather, but when laid five inches or five

and one-half inches to the weather as is often done upon upright walls, shingles become the cheapest and can be laid by less skilled laborers.

Shingles should never be painted on the outside only, as they will decay more quickly than if not painted at all, for the reason that the rain will work in at the cracks, but will work out less rapidly from a painted roof. If it is desirable to paint shingled surfaces either on the roof or sides the butts should first be dipped into thin paint an inch or two above where they lap when laid after which they may be painted with but little or no injury. The majority of shingled roofs and houses are not painted, the natural color of the unpainted shingles being preferred as more in keeping with natural objects like rocks, tree trunks, etc. A shingled house, unpainted, with window frames white or dark green and the sash black, in a setting of ornamental trees, vines, and plants; with more or less color from bright flowers, leaves and fruits, is about as near natural beauty as the hand of man can produce. Fig. 10 shows a shed covered with shingles and vines, and Fig. 11 a modern shingled house.

Painting Old Buildings.

Nothing adds more to the beauty of old buildings than a good coat of paint of pleasing colors, suited to the surroundings. Painting is one of the best investments one who owns buildings can make. We paint for two reasons—to preserve the wood work, and to enhance the beauty of the buildings. To preserve the wood work it is economy to put on a coat of paint every three to five years, according to the weather conditions and the kind of paint used. In seasons of many changes from wet to dry paint will come off of wood work more rapidly than when we have but few changes and little rain. Some

kinds of paint will stand well for from five to eight years, while others will last but a short time.

To produce the best results, buildings should be thoroughly dry, that the paint may penetrate into all the cracks and crevices and thus shut out the moisture,



FIG. 11—A Modern Shingled House.

which causes wood work to decay most rapidly. It may take more paint under this condition, but it will be economy in the end.

Time for Painting.

In view of what has just been said it would seem that during a very dry summer would be the best time to paint our houses, but the general practice is to paint in the spring or early fall, and very little attention is given to the condition of the buildings, state of the weather, etc. Perhaps the reason for this practice is the fact that the weather conditions at these times are as good as at any other season and labor less busy. The winter months have many advantages for painting. During cold weather the same amount of oil and coloring matter will be a little thicker than in the summer, will dry or

harden more upon the surface, and may thus possess just as much preservative power as if it penetrated more into the wood work. Many skilled painters use a large amount of turpentine with the first coat of paint upon old buildings to make it penetrate better, but turpentine is often almost double the cost of oil and is not as much of a preservative. Therefore while we conclude that the winter may not be the best time to paint, the work is so expensive an operation that those who are about to paint their buildings should do it when it can be done most thoroughly and most economically.

Kind of Paints to Use.

It is generally conceded that pure white lead and pure linseed oil make the most durable paint, and in the end the cheapest. With white lead as a foundation almost any medium or light colors may be produced by the addition of the necessary dark colors. A large percentage of the paints used are what are called "ready mixed."

Ready mixed paints put up by reputable dealers are good, being mixed by machinery, and therefore the lead or other pigments are more intimately mixed with the oil than can be done by hand; but in the greed for profits many ready mixed paints made by unprincipled manufacturers are adulterated, and dealers often advocate their use because of the larger profit to themselves.

Mixing Paints.

If standard white lead is used for the foundation much care and skill must be exercised if a variety of colors is desired. In this work the lead should be first thoroughly mixed so that it is smooth and even all through; then the coloring materials are to be as thoroughly mixed, and then unless a fixed formula is used a little is

added to the white and stirred until the whole is thoroughly mixed. This is repeated until the shade is just like the sample to be matched. If dry coloring materials are used, each one should be thoroughly mixed separately, with a little oil only, until smooth, then more oil added and again mixed until it will pour, then it is mixed with the white lead.

No definite rule can be given as to the quantity of various materials needed to produce certain tints, but with a sample on a card or piece of wood one must keep adding, little at a time, the colors that will produce the desired shade. In testing a color, one must rub it thoroughly with the brush in order to bring out the same shade as would be obtained by spreading it upon a building.

Popular Colors.

Every few years certain colors are "in fashion," as are coats, hats or gloves. Thus various shades of gray were popular twenty-five years ago; then came the browns a few years later; then buffs and yellows with white or dark green trimmings; and at the present time shades of green are much used. In the thickly-settled village almost any of the above shades if not too bright and glaring, smoothly put on, are in harmony with the surroundings, but in the country soft colors of gray, brown, or buff are more appropriate. White, the typical color of New England country dwellings, and some other sections, is too glaring unless heavily set with trees and shrubbery. While white lead is perhaps the most durable of paints, it is easily soiled by contact with trees, or by water running down from the eaves, and often it costs more to keep a house looking nicely in white than in some other color.

Paint Brushes.

The better the brush and the more carefully it is used the better the work will be done, but it is not advisable for the amateur to buy expensive brushes which are used for a little time and then left without use to harden and become worthless. The professional, who is using brushes continually and cares for them in the best manner, finds the best the cheapest. Ordinary cheap brushes will do good work for a while and with care may be used for a considerable time. Before using, brushes should be soaked in water or oil, to swell the bristles and the handles so that they will not pull out in using. After using they should be cleaned of paint as much as possible by rubbing on a coarse board or stones, and then be suspended in water, bristles down. If a little kerosene is put in the water it will help keep the brushes from hardening. If very hard and old, a little potash put into the water will soften up the hardened oil, though perhaps the bristles may be somewhat softened also and made less durable.

House Painting.

The professional house-painter will claim that his work is far superior to that of the amateur, yet with a few brushes and a little practice in mixing paint and putting it on, any one at all skilful in the use of tools will be able to do a good job of painting and often with a large saving in labor bills. The aim in this work should be to spread the paint evenly and to fill up all cracks and nail-holes so that water or air will not penetrate. If there are many large cracks and nail-holes, after the first coat has hardened they should be filled up with soft putty that can be pressed into small openings.

CHAPTER III

BUILDING NEW HOUSES

MANY problems confront those who are about to build a new house and settle in the country. If the readers have followed the suggestions in the preceding chapters about looking for a home, and have found "just what is wanted" or a house that can be so remodelled as to satisfy the desired conditions, they are indeed fortunate. But if only the land has been found, they face the problem of building a new dwelling-house and outbuildings.

Building Associations.

At the prevailing prices of building materials, especially lumber, new buildings cannot be constructed without more or less ready money. There are, however, many ways by which those of limited means can build. In many places there are building associations which will put up a house after one's own plans, payment to be made weekly, monthly, or quarterly, which shall cover rent, taxes, interest and something on the principal with each payment. This is a very good scheme provided the association is not too grasping and one is sure of a regular income with which to meet the payments. Builders and contractors, too, may be found who build new houses and offer them for sale on easy terms. These associations and contractors, building extensively as they do, can buy materials much cheaper than one building a single house, and therefore can afford to sell

at a reasonable price and yet make a large profit. There is the advantage in buying a new house just completed that those who have not made a study of building plans and specifications can see it in its completeness and better judge whether or not it is suited to their wants.

A Definite Plan.

The kind of house, the amount of room required, and every point connected with the undertaking should be studied and a complete and definite plan adopted. This plan may be made by a skilled architect, or the members of the family may get together and decide what rooms are needed, the details of construction to be worked out by a carpenter or builder. It is, as a rule, more economical to have a plan made by a professional architect, which will often save more than its cost in buying material, planning, and doing the work.

Contract vs. Day Labor.

If one putting up a new building has had some experience and can more or less direct and assist in the work, building by day labor is often the most satisfactory, but if he knows little or nothing of such work, it will be best and cheapest done by a responsible contractor with complete plans and the fullest possible specifications.

THE MOST IMPORTANT POINTS.

In building a house of whatever material the following points should be most carefully considered:

Location.

For comfort and healthfulness a southern or sunny exposure is desirable. While for a time during the summer, a northern and perhaps a shaded exposure may be most comfortable, unless the sun strikes a building or its immediate surroundings for a considerable part of each

day the rooms, especially during wet and cloudy weather, will become moist and unhealthful. During the winter, when fires are kept up, the rooms may become dry enough for health, but there is nothing like sunshine to destroy the germs of disease in our dwellings. If possible select a site where there are pleasant views, a sheet of water, a winding brook, extensive meadows, hills or mountains. Some locations will of course afford more of these beautiful features than others, but none should be wholly devoid of something of beauty, that we will want to have before us as much as possible. Unsightly views or objects may often be avoided in the location of the building, or be covered or hidden in the arrangement or by after planting of trees. Outbuildings should be put in the rear yet so as to be conveniently reached from the house. These should not be in such a condition as to need hiding, but should be kept neat and tidy and so decorated with trees, shrubs and vines as to be objects of beauty. Having the stable and other outbuildings connected with the house by sheds or covered passageways is a great convenience in cold and stormy weather, but the connection should not be of such heavy construction that it may not be easily pulled down in case of fire in either end.

The living-rooms should be upon the south where there is plenty of sunlight and pleasing views. Here the members of the family spend a large part of their time and everything possible should be done to make all conditions pleasant and healthful. If there are any rooms into which the sun does not shine let them be the dining-room, which is occupied but a short time three times each day, or the parlor, which may not be—but should be—opened upon more than “state occasions.” We cannot expect to combine in any one place all of the desirable features above mentioned.

An Abundance of Windows.

Nothing adds so much to the healthfulness of a house as an abundance of sunshine. At the present price of glass, and low cost for making sash, glass surfaces will cost but little if any more than the same surface covered with wood and plastering and kept painted and papered, while the glass surface unless broken will cost less to keep in repair. A space covered with a single thickness of glass will not be as warm as one lined, papered, and clapboarded on the outside and plastered and papered on the inside, but storm windows are comparatively inexpensive and will last a lifetime if taken off every spring and stored in a dry place during the summer.

The Water Supply.

As previously urged the water supply is of the utmost importance. Old wells should be looked upon with suspicion, and new ones if made should be located where no foul matter will run into them. The supply should be abundant and continuous, if possible, without the labor of pumping or carrying a long distance.

HOUSES OF WOOD.

One of the first questions to be settled after deciding to build a new house is, of what material shall it be—wood, brick, stone, or cement (concrete)? The present cost of lumber and other materials makes houses of wood very expensive, yet there is nothing more satisfactory than a well located and well built house of wood. It is warm and dry, and when the sills are carried high upon a good foundation, with a well ventilated space or cellar under it, and the outside kept thoroughly painted, and in repair, such houses may be made to last a century or more.

If the location is in the country where native lumber is obtainable, good building material may often be obtained at a much less cost than that from the North or West, especially if one has teams and can draw it to and from the mill. Native lumber is generally not as true and free from knots as that sawn from large old trees and sorted and graded before it is shipped to the dealers, yet for sills, posts, lining and roof-boards, lining of floors, sheathing and floors in stables, etc., is as good and can be purchased at first hand sometimes at half the cost.

The Frame.

Lumber for frames may be of chestnut, spruce, pine, etc., the first especially for sills where there is much moisture and the others for the frame above the sills.

Cover Boards.

The cheapest cover boards for sides and roof are native pine or hemlock, the latter only largely obtained from northern sections, where it grows to perfection. The shingles most used are of cedar, of which there are many grades offered by dealers. The extras and No. 1 clear butts are most used for roofs, though special lots of No. 2 clears may be found with but few knots in them and sound and very serviceable. This grade of shingles is largely used for covering the sides of poultry houses and other outbuildings. Other materials for roofs were discussed in the previous chapter, which see. For corner boards, saddle boards, window casings outside, spruce and pine are most used, with clapboards of spruce, and cedar shingles for covering the sides, the latter being used largely on low modern houses.

The Finish Inside.

For window casings and other finish inside many kinds of wood are used. Of the native northern lumber extra quality of spruce is sometimes used. White ash is much used and makes a beautiful and lasting finish in natural wood colors. Cypress is coming into extensive use in modern houses of medium cost, and when carefully selected most beautiful natural wood finish may be obtained. Birch, butternut, black walnut, black cherry, oak, etc., are used either alone or in combination with others with pleasing effect. Of the native southern lumber, the cypress, hard pine, tulip wood, magnolia, sweet gum, etc., makes a very satisfactory finish. When the finish is to be painted clear pine, cypress, and spruce are largely used. Window frames and casings and other inside finish are now made at factories at very reasonable prices all ready to put up, and also doors, sash and blinds, thus reducing both the cost and the time it takes to build. By carefully selecting beautifully marked boards or those of special colors for the doors, casings, etc., beautiful effects may be obtained.

Floor Boards.

Most modern floors are made of hard wood to be finished in natural wood colors, but where they are to be painted cypress, spruce and pine are used. Boards in narrow widths used in hard wood floors are much more even and durable than wide ones, though the narrower the boards the greater will be the waste and the cost of labor in laying. Floor boards should be kiln dried and be laid at once after coming from the kiln. With nicely fitted flooring any one fairly skilled in the use of tools may lay a good floor, but if fancy designs and various colors are worked into them it can only be done with success by those who can make very exact and close-

fitting joints. Of the wood used, hard pine, oak, maple, birch and black walnut are the most popular. By the use of several kinds or shades of these woods very pleasing effects are produced.

Finishing Floors.

Much of the beauty and durability of floors depends upon how they are finished. The most beautiful and durable floors are those upon which but little dressing has been used and that thoroughly rubbed in, filling the pores yet preserving the natural grain of the wood.

The best substance for, filling the pores or grain is rather thin white shellac rubbed down to a dead finish. Two or three coats may be needed if the wood is very porous, like birch. After a thorough rubbing down a thin coat of wax or oil should be applied. If oil is used a large amount of drier should be added and the floor rubbed until the surface is dry and will not soil the hand when passed over it. Wax should be put on with a heavy weight that will leave but a very thin and smooth surface.

STONE, BRICK AND CEMENT HOUSES.

With the price of lumber going higher every year, we must look about for cheaper material with which to build. Stone and brick are no cheaper than wood, owing to the high price of labor. An ordinary laborer who becomes a skilled workman after a few weeks and can work with the trowel or hammer and chisel, demands \$4.00 per day for eight hours' work. This, with the efforts of the trusts to secure a monopoly of all necessities that they may increase prices to enable them to pay large dividends, will be sure to keep these materials on a par with wood. This may be said also of steel and iron, which enter so largely into the construction of large structures.



FIG. 12—A BRICK HOUSE IN THE COUNTRY.

840U

Brick Houses.

Even if brick were available at a more moderate cost, and labor was reasonable in price, this material seems out of place in the country and has little to recommend it above wood (Fig. 12).

Stone Houses.

A stone house (Fig. 14) is more in keeping with country surroundings but is also open to the objection that the cost of labor first in getting out the stone, and then in building, makes it almost prohibitive to those of ordinary means. A brick house may be made with a hollow wall, but a house of ordinary stone must be made solid, and additional furring and lining inside must be used to keep it dry and warm. Rustic stone is largely used in the construction of the foundations and first story of dwellings and is in keeping with the natural country surroundings; but this is open to the objection that the walls must be made thick and a frame or furring be put inside to keep the house dry and warm. With the increased cost in building material persons of ordinary means are looking for something cheaper than stone, brick, or wood, and as a large percentage of the cost of building is the labor, some system is needed by which material of low cost may be put together by the owner or by ordinary labor. This problem seems to be in a fair way of being solved by

Cement or Concrete Buildings.

A material that is now attracting much attention for buildings of moderate cost, is Portland cement and sand. This material is found in many sections of the country. It is sold at a very reasonable price and if trusts are not allowed to obtain a monopoly of the

supply it should be even cheaper, and will be largely used for structures of small or medium size. As stated above, the cost is low in comparison with other building materials, and much of the labor of building can be done by the owner or his regular help if fairly skilled in the use of tools and such materials. Good brands of



FIG. 13—The Construction of a Solid-Wall Concrete House,
Reinforced by Steel Rods.

Portland cement fresh from the kiln mixed with from one to three parts of clean sharp sand will make solid walls or blocks, practically as durable as brick or cut stone.

The Solid Wall.

Two methods of construction of cement buildings are in use—solid walls, and the block system. By the first, solid walls are made by putting up a frame of plank very nicely fitted and filling the space with the mixed cement, sand and stones, raising the frame as each layer of cement becomes hard until the walls are of the desired height. Fig. 13 shows the construction of a solid wall



FIG. 14—A STONE COTTAGE IN THE COUNTRY.

814

reinforced with steel rods and Fig. 15 a section of a house with solid walls.

The difficulty of building the walls in this way is that being porous, moisture and cold readily pass through and the inner surface can only be made warm and dry by building up an inner frame or putting up furring upon which to plaster, leaving an air space between the wall and the inside surface. In building up walls in this way more or less large stones are sometimes laid and the cement filled in, carefully working it in and about them so that no air spaces will hold to the plank or stones.

The Block System.

By the block system the cement is put into moulds of the desired form and size for the various parts of the building. These blocks may be made to represent cut or rough stone, the corners, window frames, sills, and caps, etc., being either plain or ornamented. Air spaces are obtained by having vertical openings which shall be continuous from underpinning, or by having the walls made of double blocks with narrow boards or planks placed perpendicularly at the joints, thus making an entirely hollow wall. The latter makes by far the best non-conducting wall and the blocks are less complicated in structure, though double the number are required in the building. One of the advantages of the block system is that a few blocks may be made at a time as one has the leisure, and are just as good, possibly better, if one is a year in making enough for a house. Fig. 16 illustrates a house made of concrete blocks, and Fig. 17 a machine by which the blocks are made.

The Cement and Sand.

Good work cannot be made of cement more than six months old as it is ordinarily kept, but if it has been

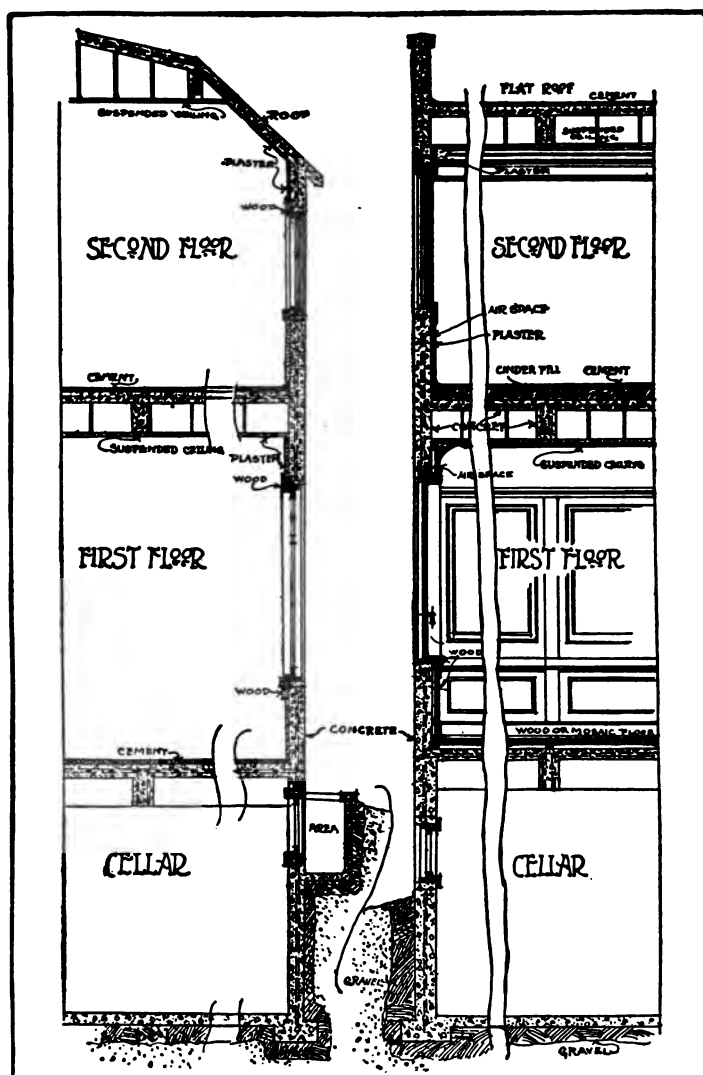


FIG. 15—Section of a Concrete Fire-Proof House with Solid Walls Reinforced with Steel Rods.

stored in a perfectly dry place and at an even temperature it may retain its strength a much longer time. The best brands only should be used, especially for the blocks and trimmings, and if possible its quality and strength should be tested before using.

The sand used should be clean and sharp. Freedom from organic matter may be tested by putting a small quantity in a pail with clean water, giving it a rapid



FIG. 16—A Cement Concrete House, made of Hollow Blocks.

stirring, and pouring off quickly, the organic matter will soon settle on the bottom of the vessel into which it is poured. The sharpness of the sand may be determined by examining its particles with a magnifying glass. The coarser the sand, if of an even grade, the better. Fine broken stone when it can be obtained is better than sand. Very coarse sand, gravel or broken stone should also be used with the fine sand and cement.

Mixing Cement and Sand.

In making a solid wall or blocks of cement it should be with the idea that they are to last for centuries, but this cannot be unless cement of the best quality is used and thoroughly mixed with the best of sand. In mixing, a layer of sand (two, three or four parts) is spread out



FIG. 17—A Machine for Making Hollow Concrete Blocks.

evenly on the bottom of the mortar-bed; one part of cement is spread evenly over it, and then the mass is shovelled over back and forth until thoroughly mixed, when water is added and the mass is given another thorough mixing. For making solid walls or laying up rustic stone, cement should be as soft as it can be made to hold to the stones and should be used as soon as made. For the moulds, what is called the dry mixture is most

used—just water enough to thoroughly mix the sand and cement; and when tamped into the mould a little water will stand on the surface. When the cement in the mould is sufficiently set the mould is unlocked, the block carefully taken out and placed in the shade or a moist room and sprinkled a few times until thoroughly hard. Soft cement may be poured into the mould and when fully set—in a day or two—it is taken out and the mould refilled. This, however, is a slow process.

Concrete walls, either solid or of hollow blocks, are very desirable for stables and other outbuildings, especially for the foundation, basement, and first story, where there is a large amount of moisture, which would rot a building made of wood. It makes very clean and serviceable floors for stables, carriage and tool rooms. Sidewalks are now largely made of this material, some cities having miles of it that will apparently be as durable as cut stone. This material is very valuable for floors of outhouses, cellars, wood-sheds, etc.

HEATING THE COUNTRY HOUSE.

Country houses are generally more difficult and more expensive to heat than those in thickly settled villages or towns, in part perhaps because of their cheap construction, but more because of their exposure. A house built of good material, closely fitted, and lined with paper over the entire covered surface, ought not to be difficult or unusually expensive to heat unless fully exposed to prevailing winds. One of the most important points to be considered in the plan of the house is the method of heating.

Wood Fires.

In the country where wood is abundant and cheap the year's supply may often be obtained by thinning out the poor and surplus growth from the wood-lot, and if

one has sufficient area the supply can be cut and the lot improved with each yearly cutting. The heat from wood is less lasting than that from coal, and the work of attending the fires much greater. Where wood is used it should be stored where it may be easily reached. Wood must be burned in close stoves to be economical of heat, but in such stoves—airtight—the oxygen of the air is quickly exhausted unless there is adequate ventilation through a fire-place or open spaces into the chimney near the floor. Large cast-iron airtight stoves are now made in which may be burned large sticks of one or two cuts which will last a long time and keep up an even heat. Coal stoves for heating living-rooms are open to some of the objections urged against the wood stove, but they take up less space and the heat is more even. Where one must buy wood its cost, including cutting up for the stove, will in most localities be equal that of coal.

Furnace Heat.

A large amount of labor is required to keep stoves running in several rooms of a house and the consequent dirt and dust is very annoying. In the more comfortable modern country houses we now find the heating done by one large furnace or boiler in the cellar or basement. By this method only one fire is kept up, and where the coal or wood is stored close to the furnace little or no more work will be required to run it than would a single stove in the rooms above, where all of the fuel is carried up and the ashes taken out every day. With tight floors and well-fitted registers and pipes all the dust and dirt are kept from the rooms above.

THREE SYSTEMS OF HEATING—HOT AIR, HOT WATER, AND STEAM.

Heated air passing directly from outdoors to the rooms to be warmed is the ideal heat if it is not passed over a too hot surface which burns the air as in the ordinary hot-air furnace. The indirect hot-air heat is produced by passing cold air from outside over surfaces of hot water or steam-heated pipes, and is not open to the objection of the ordinary hot-air furnace, but the cost of heating by this method is much greater. Another objection to a hot-air furnace is that we cannot always direct the heat where it is most needed under all conditions of weather.

Hot-Water Heat.

Heated water distributed through small pipes to radiators or stacks in the rooms to be heated gives a very economical and pleasant heat. It can be carried to the exact point where needed and little or much heat may be produced, according to the extent of radiating surface or the temperature of the water. Two kinds of boilers are used for water heating—the wrought-iron, with tubes, and the cast-iron boilers of many different forms. The wrought-iron boiler is generally considered the most economical of heat while new and if kept clean, but in moist cellars scales of rust soon form on the inner surface under which are air-spaces that keep the heat from coming in contact with the inner or water surface of the boiler, and after a few years the boiler will need renewing.

Cast-iron boilers may be used with less risk in wet cellars, as the surface does not rust in scales and the heat will pass through the rusted iron almost as readily as if it were new.

Most of the modern cast-iron boilers used for house and greenhouse heating are made in sections, so that a small number of sections are used for small buildings and more are added for larger ones. Another advantage claimed for sectional boilers is that if one section cracks or is in any way defective it can be replaced without buying an entire new boiler.

Steam Heat.

Where a large amount of heat is required steam is, however, very satisfactory. If a small amount of heat is needed it can be obtained only by running steam through a small number of pipes. No heat can be circulated in the pipes until the water gets above 212° , and all heat is lost when it falls below this. The cost of piping for steam heat is less than that for hot water.

With steam and hot-water heating no provision is generally made for introducing fresh air into the rooms. But if the building is loosely built or ventilation is provided for by an opening into the chimney near the floor, the foul air will be rapidly replaced by that from outside.

CHAPTER IV

THE DECORATION OF HOME GROUNDS

"Be it ever so humble
There's no place like home."

THE more of beauty and comfort there is about the home the better one can stand the trials of life, the more enthusiasm and energy one can put into the work of getting a living and caring for the loved ones in the home, and helping those about him.

Preserve all Naturally Beautiful Features.

There are very few homes about which there are not more or less attractive features. All of these should be studied carefully and nothing be destroyed or changed without good reasons. The rocks, trees, shrubs, vines, woods in the immediate surroundings of one's own place, and the distant views of hills, meadows, or water, should be kept distinctly in mind in all the work of changing and improving or planting, so that none be covered up or destroyed. If there are unsightly objects near we must study how not to expose them to view or to hide them if conspicuous. We should preserve and improve the natural growth of trees and not cut one down without due consideration. It takes a long time to grow newly-planted trees to the size to afford shade or produce much of beauty, and we should make the most of any already standing. It is generally the case that trees growing naturally along the roadside, in the hedge-

rows or other neglected places, are well established in good soil; and with a little care, a little manure, fertilizer or mulch during the dry weather of summer, they will start into a most vigorous growth and reach maturity much quicker than those transplanted from other places. Trees under these conditions are often of very imperfect shape and may require heroic treatment to put them into condition for ornamental uses. When

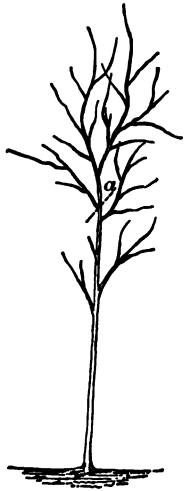


FIG. 18—A Tall Young Tree showing at "a" where to cut back to make it Branch Low.

trees are growing close together the branches are set very high on the trunk, thus making it difficult to produce a low headed, well formed tree. This is overcome by pruning as in Fig. 18. If a close growth in the form of a grove is not desired, we must thin out the poorest, leaving such as may be desired, and by cutting back the top, as here illustrated, sometimes with small trees to a bean pole condition, start a new head at the desired height. Larger trees with several main branches may be treated in a similar manner, cutting these branches back to stubs a foot or more in length, from which new branches will soon start. After cutting back in this manner the ends of the cuts should

be covered with paint to prevent decay. When the new sprouts begin to grow from the top of the pole, or the stubs, they should be carefully examined and the ends of all not needed to form a good head—three or four from each top or stub—pinched back so as to force the growth where it is desired. There should be one central shoot or leader and three or four side branches well distributed on all sides of the top, and thus a well-

formed head or top is established. If these shoots grow close together or all upon one side the top will soon break or split down and the tree be ruined. Deciduous trees only can be treated in this way. Evergreens do not readily send out side shoots when the branches are all removed, but if the lower branches are fairly good they may be improved by cutting back the leader (Figs. 19 and 20), thus forcing growth into those that remain.



FIG. 19—A Norway Spruce with the Leading Shoot Cut Off to Force Growth into the Lower Branches.



FIG. 20—The Result of Cutting Off the Leading Shoot.

Evergreens with long bare trunks are not considered as beautiful as those with the lower branches sweeping the ground, but they possess a kind of beauty of their own and in the grove the removal of the lower branches becomes a matter of necessity to let in the light and air.

Trees that have been planted by the roadside but are now in bad condition from neglect may be improved by the method suggested for those of natural growth.

Trees which have been allowed to grow two main leaders,



FIG. 21—Forked Branch of Tree Broken Down by Ice, Repaired and Supported by Rod.

and are beginning to split at the fork, should be attended to at once and bolts with large nuts or washers put through and the crack drawn close together, when in a few years the wound will be healed over, covering bolt, head and all. Fig. 21 shows the result that will come to trees with forked main branches.

Time for Pruning.

Most trees may be pruned at any time when the leaves are off, but those that flow sap freely—the walnuts, maples, birches—had better be pruned late in the fall or in the spring after the buds begin to swell. Evergreens may be pruned at any time without serious injury except when frozen, at which time the wound is rough and broken and does not heal as readily as when pruned in early summer. If pruned late in the summer there will be little healing growth formed before winter and the wound will grow larger by freezing and thawing. All wounds upon deciduous trees should be covered at once with a thick coat of linseed oil paint, shellac, or coal tar. The first is most easily obtained and applied and is as good a preservative as either of the others. A

second coat should be applied to large wounds after the first has hardened. Evergreens exude a pitch or resinous covering where injured and need not be so protected.

Planting New Trees.

A greater part of the decorating about country places is done by setting out new trees and shrubs. Most of these come from nurseries and are set in stiff, formal rows along the streets and avenues, or along boundary lines. Planted along the roadside, they afford shade from the hot sun in the summer and in some places shelter from driving wind storms. An avenue of trees leading from the road to a dwelling some distance back is also a thing of beauty, but one of rather formal character, though desirable unless some beautiful view is cut off by it.

More pleasing effects may be produced if

the trees are arranged more or less in groups, in some places covering up undesirable objects or views and in others enhancing the beauty of objects by a setting of striking foliage. Large fine specimen trees standing near the house as in Fig. 22, should be most carefully preserved. Very old trees, often with decayed trunks, if still vigorous, may be preserved a long time by digging out the dead loose centres, painting with linseed oil paint, and then filling with concrete.



FIG. 22—A Perfect Purple Beech Tree, the result of Good Soil, a Northern Exposure, and Plenty of Room.

Some of the Best Street or Avenue Trees.

Among the most largely and easily grown street or avenue trees the elm may be ranked as the best. Its high arching branches afford an abundant shade and yet allow a free circulation of air under them. The sugar maple, red and white or silver maple, tulip tree, red and pin oak, cucumber magnolia, all make good street or avenue trees but the branches should be started high that they may not interfere with travel as they increase in size.

In many states the street planting is in the hands of one individual, known as the Tree Warden, and that functionary assumes all the work of planting and caring for street trees. While this may give more uniform results, it will generally be after one idea, one plan, with little or no variety, and it takes away all interest in such work by the abutter, therefore little street decorating will be done under such conditions except at the public expense. But the spirit of commercialism and public ownership should not suppress all sense of individual responsibility for the public good. A large majority of the beautiful avenues and attractive roadsides which make certain cities, towns and villages noted for their beauty, was largely the work of public-spirited individuals who planted for the love of the work and for posterity.

Home Decorations.

The subject of decorating home grounds except in a moderate way is one too large for the limits of this volume, and for more extended information the reader is referred to the author's work on "Landscape Gardening as Applied to Home Decoration," and other popular works upon this subject.

Grading About the Buildings.

The first consideration after a new house has been built is the grading of the ground about it and locating such walks and drives as are needed. In this work aim should be to have an even, smooth grade away from the buildings, so that the surface water may run off quickly and not settle into the ground about the foundation, provision being made for carrying the roof water away in concrete or paved gutters or underground drains to an outlet some distance away. Care must be taken that no basins are formed where the water will stand during heavy rains or in the winter.

There should be no unpaved gutters along the roads or walks to catch the water and thus cause washouts. In grading, the coarse and poor material had best be put on first and then a top dressing of good loam not less than ten inches in thickness. A poor soil may be so improved that it will grow good trees, shrubs and even grass, by deep spading or plowing and working into it a large amount of rich manure or fertilizer, but the better it can be made in the grading the less after work will be required.

Roads and Walks.

Walks and drives are a necessity for comfort on any place, and especially upon the farm, where more or less teams are kept and where a large amount of produce is to be carried out and supplies brought in. Yet they are artificial structures, expensive to build and keep in repair.

Location of Roads and Walks.

The location of roads and walks is a very important matter. We are planning these conveniences with the idea of a permanent home, and an unsatisfactory location means much inconvenience, loss of time, and hard

work. As few roads and walks as is possible should be made, laid out in graceful curves, yet running as directly

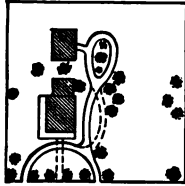


FIG. 23—Location Drives and Walks.

from the entrance to the points of destination,—the house, barn, or stable, as may be. Where convenient, the road and walk from the street to the house may be combined and made of one material, or the walk may be made of concrete but occupying only one-fourth or less of the same foundation with the balance of gravel for the road. This will save space for more lawn and shrubbery,

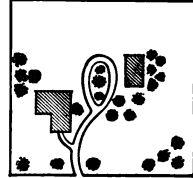


FIG. 24—Another Plan of Drives and Walks.

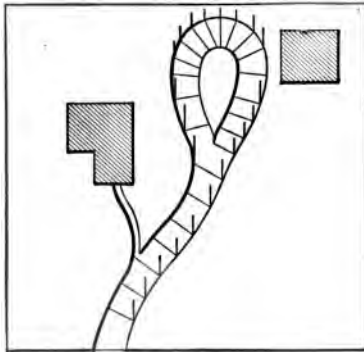


FIG. 25—How to Lay Out Drives and Walks.

etc. Where possible the drive should come close up to the door most used, that all may get in and out of the house with comfort in stormy weather. The arrangement of walks and drives and manner of laying them out is shown in Figs. 23, 24,

25.

Underdrain the Road-Bed.

A good road cannot be made of poor material, and no matter what material is used a road will be of little permanent value if the soil is saturated with water. In grading up about the buildings the good soil where the road is to be made may be taken out and replaced with stones and very coarse gravel. The amount to be taken out may depend upon the nature of the soil. If the

loam is deep it may be cheaper to get as much as possible from this source and replace it with stone or gravel. The excavation for the road-bed need not be below the stratum of gravel or hard-pan, though in the latter

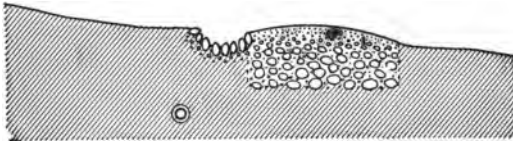


FIG. 26—Section of a Road with Tile upon Upper Side only.

case one line of tile should be put in at least three and one-half feet deep, either in the middle or on one side—the upper side, if upon a side hill, as in Fig. 26. On very wet land nearly level two lines of tile may be needed, as shown in Fig. 27.

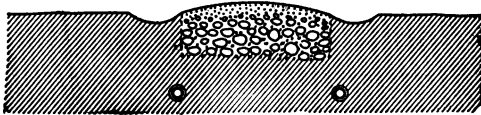


FIG. 27—Section of a Road with Drain Tile on Both Sides.

Coarse gravel with the larger stones raked into the bottom of the road-bed will make a good road if under-drained. Broken stone if available will make a much more permanent road than gravel, though it is very expensive and requires a heavy steam roller to compact the different layers of stone. If neither of the above materials comes within the means of the owner, a well-rounded gravel road on top of the soil will serve a good purpose in dry weather. When there is but little travel over the road a well-compacted turf will be very satisfactory. To make a turf road the land is back-furrowed the desired width and the rounded surface made fine, mellow, and rich. A liberal amount of lawn-grass mixture is then sown and rolled in with a heavy roller.

After the grass has become well established frequent rolling and cutting with a lawn-mower will fit it for the use of anything but heavy teams. Care must be taken not to have it cut up by heavy teams during the fall and spring. This is pleasant to walk upon and is as dry as any walk except when there is rain or dew upon it. The surface of a walk should be a little above the level of the lawn but not enough to cause water to gather upon the inside of a curve on a hillside and cause washing. Where well underdrained the surface should be flat but upon undrained land a slightly rounded surface is necessary.

To Keep Down the Weeds.

Upon a road or walk surfaced with ordinary unsifted gravel there will be more or less weeds during the growing season unless it is frequently gone over with a weed-killer or hoed over with a sharp hoe with a thin blade. If the surface is dressed with three or four inches of fine screened gravel or fine broken stone few weeds will start except in very wet weather.

Concrete Walks and Drives.

When one can afford the expense, concrete walks, either of cement or asphalt, will be found cheaper in the end if properly laid, but if improperly made and upon an undrained foundation, will be little or no better than one of gravel. The first and most important point in this work is the foundation. A durable walk or drive cannot be made on any soil saturated with moisture in freezing weather. Such soils must be underdrained with either land or Akron tile, the latter being much better where the soil is liable to freeze about it. A stone drain is sometimes used, but the writer has never seen such a drain that did not fill up within a few years.

The directions for mixing cement concrete are the same as for concrete buildings which was described on page 68. Upon a steep slope the surface of the concrete should be ribbed to prevent slipping or the surface covered with boards in icy weather. For the foundation of a cement concrete walk a dry mixture of from four to six parts of sand and coarse gravel to one of cement, from four to six inches thick, is thoroughly tamped so as to be smooth and level. Then a layer of one to two inches of concrete, two or three parts of sand to one of cement, thin mixed, so as to work easily, is spread over the surface and made smooth. To prevent the concrete from cracking irregularly by the action of frost from below, it is sometimes made in squares or sections with a thin board between the sections to take up the contraction and expansion. After laying cement concrete it should be kept moist until fully set by covering with hay, straw, mats or even sawdust, or by sprinkling two or three times.

With tar concrete the first layer from four to six inches thick of coarse stones from one to four inches in diameter must be made solid by tamping or rolling as for the foundation of cement concrete, as well as the two succeeding layers of small stones. The last layer is of fine clean sand and hot tar, thoroughly saturated and mixed, heavily rolled and then covered with fine dry sand until somewhat hardened. Concrete walks have the advantage that they may be easily kept clean in summer or winter and no weeds will grow upon them, but they are often slippery in icy weather and reflect the heat during the summer.

Screen the Walks and Drives With Shrubbery.

Where walks and drives are wide and of considerable length they should in part at least be covered from view

by grouping masses of shrubs along the border. These are to be placed so as to screen the walks from view from the principal windows of the house, from the balcony, veranda or bay windows, or from the roadway in front of the house. If the place is small these groups of shrubbery must be small, in some cases only a single line of plants. Even hardy perennials will take off some of the sterile appearance of this stretch of bare soil in the midst of the living green of the lawn.

Planting Trees and Shrubs.

With the new house, the outside decorations are yet to be grown, except what may by chance have been preserved from the roadside or hedge-rows, the treatment of which has been discussed on preceding pages. A home without more or less trees about the buildings and grounds is a forlorn place, exposed to the full heat of the sun in summer and storms and winds in the winter. While newly planted trees and shrubs appear to grow slowly to those waiting for their grateful shade it is but a comparatively short time before they will give an abundance of shade and shelter if planted at the earliest possible time.

WHERE TO OBTAIN ORNAMENTAL TREES AND SHRUBS.

No country in the world is richer in ornamental trees, shrubs, and plants than ours, and some of the most beautiful may be found growing by the roadsides or in pastures and woods, and may be readily transplanted to the house grounds. A large majority of the trees which we see by the roadsides and along the avenues were taken from these places. Trees of sufficient size for moving under the above conditions have generally been growing where found for a considerable time and the

fine fibrous roots have extended further from the trunk each year so as many fibrous roots will not be obtained as we find upon trees from the nursery that have grown more quickly. Yet by digging carefully and heading back severely most of them will grow and make good trees. In digging trees from these natural locations a trench should be cut a foot wide from one to two feet away from the trunk and deep enough to work the soil out from under the ends of the roots and thus allow us to tip the tree over by taking hold of the trunk, in this way loosening the roots with a ball of earth attached. This ball may be rolled out upon a stoneboat, or put upon a low wagon, and the tree in this condition taken to the place of planting. In planting trees of all kinds it is as important to have a fine mellow bed of rich soil in which to set them as for planting seeds. A hole a little larger than the spread of the roots should be dug from one to two feet deep, according to the roots. The soil in the bottom of the holes should be rich, fine and mellow, but rank unfermented manure or caustic fertilizers should not be used in contact with the roots. When ready to plant place the tree in the hole, which if not deep enough must be made deeper or if too deep filled up. When at the proper level, so that all the roots will be covered, the upper ones not less than six inches deep, work fine rich soil in about them and press it firmly in contact with every root and fibre. When all the roots are covered and the soil pressed about them the last four to six inches of soil should be put on lightly, thus forming a mulch which will hold the moisture under it and in contact with the roots below. The tops of all trees taken from the roadsides or fields must be more severely pruned than those procured from nurseries.

Time for Planting.

The best time for transplanting deciduous trees is early in the fall or early in the spring. Either of these times when the work can be most thoroughly done is the best. If very large trees with considerable top are set out in the fall they should be well supported by stout stakes driven deep into the ground or wire guys running to stout stakes set at the surface of the ground.

Planting Evergreen Trees.

As these trees are in foliage all the time they may be set out at almost any time when it can be done without exposing the roots to dryness or breaking and destroying too many of the fibres. Early summer after the buds have started and the month of August are the times when most evergreens are planted. In moving them a moist day should be selected and if possible a ball of soil should be taken with each tree. If the roots become dry they will never regain their vitality and the tree dies.

The Arrangement of Trees and Shrubs.

In arranging trees and shrubs about the home place it should be done with the aim to make the most attractive home picture possible and at the same time afford shelter from the sun and protection from cold and storms. The central idea in grouping is to make a pleasing setting for the buildings with the lawn in the foreground. If the grounds are limited in extent a few specimens only can be grown without too much obscuring the home picture. A single large old tree with a well-kept lawn and a few flowering shrubs or plants will be more satisfactory than a tangle of imperfect specimens. If of larger extent, a number of varieties of trees may be used, sometimes grouping several of one kind or mixing many

kinds together. In this work we must always keep in mind the beauties of the home buildings as seen from the outside and the home and distant views as seen from the windows of the principal rooms, the verandas, or porches. See Fig. 1.

Close Planting to be Avoided.

When planting we must keep in mind the size of the trees and shrubs when fully matured. While young they produce but little shade and shelter and as all desire immediate effect thick planting is generally done with the idea that we will cut out all but the few that will give the desired results when mature. But few will do this, and all are finally ruined for anything but grove trees; therefore it is generally better to plant just what are needed permanently and it is surprising in what a comparatively short time trees with full root and air space will reach mature size.

DECIDUOUS AND EVERGREEN TREES.

Deciduous trees are of especial value for summer and evergreens for winter decorations, the leaves of the former shutting off the intense heat of the summer sun, while the latter shield us from the fierce winds of winter and afford a beautiful contrast with the bare and brown trunks of the deciduous trees. If one has a considerable area to plant, groves of mixed varieties are effective, though an oak, chestnut, or pine grove each has characteristic beauty that would be lost in a mixed grove. For such groves close planting is desirable, that the trees may grow tall and straight with branches high from the ground. Evergreens make the densest shade in summer, but in winter are rather dark and gloomy. When the ground is covered with snow an evergreen grove possesses great beauty.

Fruit Trees as Ornamentals.

Upon grounds of small area as much of beauty may be produced from fruit trees as from any of the so-called ornamentals. What can be more ornamental than an apple, a cherry, peach or plum tree when in bloom, and again when in fruit? They are things of beauty and a source of much pleasure, and even of profit. Close planting of fruit trees should be avoided, as with ornamentals, for while the flowers and fruit may be just as beautiful and good up in the tops of close planted trees, stretching upwards for sunlight, they are beyond our vision and reach, while a low headed tree is far more beautiful and useful.

In thickly-settled localities fruit trees are often a source of trouble from the attraction the fruit has for "Young America," and the cost of guarding against loss from this and other sources will perhaps make other ornamental trees more desirable.

LIST OF TREES.

The following are among the best native trees that may be transplanted from the roadsides and fields:

WHITE ELM,
SLIPPERY ELM,
SUGAR MAPLE,
RED MAPLE,
SILVER MAPLE,
MOUNTAIN ASH,
BASSWOOD,
CANOE BIRCH,
SWEET BIRCH,
WHITE ASH,
RED OAK,

SCARLET OAK,
WHITE OAK,
MAGNOLIA,
CATALPA,
SYCAMORE,
BEECH,
HICKORY (WHITE),
TULIP TREE,
SWEET GUM,
POPLAR (COTTONWOOD),
KENTUCKY COFFEE TREE.

Introduced Trees.

Most of the following trees must be obtained from nurseries, though sometimes good specimens may be found by the roadsides or in the fields:

NORWAY MAPLES,	HONEY LOCUST,
PURPLE BEECH,	SCHWERDLER'S MAPLE,
HORSE CHESTNUT,	EUROPEAN LARCH,
VIRGILEA (YELLOW WOOD).	

Evergreen Trees, Natives.

WHITE PINE,	CANADA BALSAM,
WHITE SPRUCE,	JUNIPER,
ARBOR VITÆ (WHITE CEDAR),	HEMLOCK.

Evergreen Trees, Introduced.

NORWAY SPRUCE,	AUSTRIAN PINE,
COLORADO BLUE SPRUCE,	SWISS PINE,
NORDMAN'S FIR,	JAPANESE CYPRESS (RETINOSPORA).

Ornamental Shrubs.

No matter how small a place one may have, there may be room for one or more ornamental shrubs or climbing vines. If the land owned is only large enough for the buildings and the necessary walks, shrubs may be planted in the angles of the buildings or corners of the fence, and vines may be made to grow over the gate-way, veranda, or porch, or to cover the walls of the buildings. On the north side we may plant rhododendrons, or English ivies may be made to cling to the walls, while nearly any of the list on pp. 94, 95 may grow on the south, east or west if the soil be made rich and mellow. In some cases the soil may be only the gravel or clay excavated in making the cellar, or dump material, which must be removed and replaced by good soil.

Grouping of Shrubs.

On places of larger area shrubs may be arranged in masses or groups, by the sides of walks and drives, as a setting in front of the foundation of the house, and in the angles, in front of outbuildings, and bank walls, etc. They are useful in carrying the mass of tree foliage down to the lawn, and make beautiful low screens, for hiding seats, terraces, the vegetable garden, or other low objects. Where the extent of the grounds will allow, groups of shrubs of one kind will produce more striking effects than if many varieties are mingled together. Thus a group or mass of roses, rhododendrons, hydrangeas, spiræas, etc., may be placed, one in one corner of the grounds, another in front of the poultry house, another in front of the steps leading up to the side door, and another in front of a terrace. Then with a well-kept lawn with a glimpse of the drive or walk here and there in view, we have a more attractive picture than if in the groups of shrubbery we could see but one or two in bloom. Mixed groups are often desirable when close up to a much frequented veranda, so that something may be seen in bloom at all times during the summer. Along the roadways or on boundary lines between estates a row or border of shrubs marks the line very prettily. These may be set in a straight line or hedge or in an irregular border, wider in some places than in others. If the groups are large and of many kinds those growing the largest should be set in the middle or if the border is against the boundary line, a building, wall or terrace, the largest should be set next the line or the object covered, the smaller ones grading down to the lawn in front (Fig. 28).



FIG. 28—TREES AND SHRUBS APPROPRIATELY ARRANGED ON THE LAWN AND IN FRONT OF THE DWELLING.

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Hedges.

Where the space is narrow or where there are other formal features upon the grounds, the closely-pruned hedge may be used with good effect especially on the boundary line, but is a difficult and expensive thing to grow and keep in good condition, and often furnishes a harbor for insects and vermin. A good well-kept hedge may serve as a fence or high screen, but those plants



FIG. 29—Low Shrubs Planted in Front of Tall Ones.

that naturally grow to trees must be used, like the honey locust, buckthorn, osage orange, etc. To keep these trees in a compact dwarf shape they must be pruned several times during each growing season. More graceful hedges are made of such plants as roses, spiræas, weigelas, lilacs, Japanese Barberry, etc., by a more open method of pruning, cutting out here and there old canes so that new shoots can grow that will give more and larger flowers than the old wood.

Pruning Shrubs.

Shrubs that bloom early in the spring, like golden bell, spiræas, deutzias, Japanese quince, etc., should not be much pruned until after blossoming. If pruned before blooming many of the flower buds are cut away. Those that bloom later in the season, from June on, like roses, hydrangea, hibiscus, etc., should be pruned severely before growth begins. If upon a rosebush we leave but three or four strong shoots and cut these back to three or four buds we shall obtain one or more strong shoots from each cane and upon these there will be a good number of very perfect flowers, while if the bush is left unpruned we may get a larger number of smaller flowers. If we want a large shrub and a display of a mass of color we would not prune much, but if a fine display of large perfect flowers is desired, we would prune severely and thus cause a limited number of strong shoots to grow.

List of Shrubs, Native.

PINK AZALEA,	CRANBERRY SHRUB,
BARBERRY,	WILD ROSES,
CLETHRA,	SWEET BRIAR.

List of Shrubs, Introduced.

AZALEA, JAPANESE,	EXOCHORDA,
JAPANESE QUINCE,	GOLDEN BELL,
DEUTZIA,	ROSE OF SHARON
WEIGELA,	HYDRANGEA,
SPIRÆA,	LILAC,
JAPANESE SNOW-BALL,	ROSES,
JAPANESE BARBERRY.	

Evergreen Shrubs.

NATIVE.	INTRODUCED.
RHODODENDRONS,	BOXWOOD,
MOUNTAIN LAUREL,	ANDROMEDAS.
AMERICAN HOLLY.	

CLIMBING SHRUBS OR VINES.

Among the most beautiful and satisfactory ornamentals for country homes are hardy vines (Figs. 30 and 31).



FIG. 30—A Beautiful Shingled Summer House.
A Good Support for Climbing Vines.

There are many varieties, some of which will grow under almost any condition of soil and exposure, and they do not need much space. They can be trained along fences, upon verandas, and the sides of buildings, or be made to cover arbors and summer-houses. Upon the sides of buildings they do best if carried away from the walls ten inches or a foot upon wires or other supports.

Pruning Climbers.

Unless climbers are heroically pruned every year the foliage soon becomes so dense that with close hot weather mildews and blights often seriously injure

them. Before growth begins in the spring a considerable portion of the old wood should be cut away and the space occupied by it given to vigorous new shoots.

The best results come from summer pruning or pinching. The ends of the canes should be kept tied to their proper support and all shoots not needed to cover the trellis or support be pinched off, thus forcing the growth where most desired.



FIG. 31—A Rose-Covered Porch.

List of Climbers.

NATIVE.

AMERICAN WOODBINE,
VIRGIN'S BOWER (CLEMATIS)
BITTER SWEET,
WISTARIA,
CLIMBING ROSES,
ARISTOLOCHIA (DUTCHMAN'S PIPE),
GRAPEVINES, ETC.

INTRODUCED.

CLEMATIS, JACKMAN'S,
CLEMATIS PANICULATA,
HONEYSUCKLE (JAPANESE),
KOKWA (ACTINIDIA),
JAPANESE WOODBINE.

REMOVAL OF WALLS AND FENCES.

A great transformation has taken place along our roadsides and in front of our dwellings in the past quarter of a century, resulting from the removal of stone walls and fences. At best these are artificial objects and sooner or later will become unsightly. They are unnecessary in most cases and are expensive to build and keep in repair. They are more or less a harbor for weeds, mice, and vermin, and the space occupied by them can be more easily and satisfactorily cared for if the fences are removed. In some cases they are a necessity for the protection of orchards and fruit plantations, but often a conspicuous fence acts only as an incentive for malicious persons to cause trouble. If a fence is needed one of wire will be more protective and inconspicuous, and when painted green becomes ornamental. Fences are of course needed about land pastured by cattle and horses, but each owner of cattle, horses, dogs, etc., is expected to keep his stock at home or within the limits of the street, and is liable for any damage they may do while driven along the highway.

CHAPTER V

THE LAWN AND FLOWER GARDEN

THE LAWN.

NO one feature of the outside decoration of the home is of so great importance as the lawn. We may have beautiful buildings, and an abundance of trees and shrubs upon our grounds, but if the grass is poor the place has an unkempt appearance. The lawn is the carpet, or foreground upon which the various objects of beauty or comfort about the place are arranged.

To make a perfect lawn easily and cheaply one must have good grass land—*i.e.*, a deep, strong loam, clay loam, or clay soil, well underdrained. For the most perfect growth of lawn grasses the land should be underdrained, if springy, deeply worked, and made rich with stable manure or suitable fertilizers.

Time for Sowing Seed.

Upon rich, moist soil, grass seed may be sown upon the lawn at any season of the year with good success, but the spring from April to June, or August and September are perhaps the best times for sowing. If the seed starts later than September, during the fall it makes little growth, and the roots not extending deeply during the winter, the little plants are heaved out and we have a poor catch. Then with late fall seeding, unless the land is well covered with deeply rooted plants, it is likely to wash on sloping surfaces. The natural seeding

time for grasses is August and September for early maturing grasses, and the early spring for seeds that are scattered late in the fall.

Lawn Grasses.

The best grasses for the lawn are June grass (Kentucky blue grass), and red top, equal parts of each, with a little white clover (10 lbs. per acre); forty to fifty pounds of this mixture will seed an acre. The seed-bed should be very thoroughly made, working the soil deep and fine. It should be smoothed and rounded with a flowing outline and no perfectly level places except for lawn tennis or croquet grounds. Terraces should be avoided as artificial, difficult to make, and expensive to keep in good condition. The surface of a terrace will often slide down when the frost is coming out of the ground in the spring, and it soon becomes uneven, while it is difficult to cut the grass smoothly. A rounded, even though rather abrupt surface will remain solid, and the grass may be easily cut with the lawn-mower. Care must be taken that no basins are formed that will hold water after heavy rains or during the winter, as the grass is often killed by a close covering of ice.

Sowing the Seed.

When the soil has been satisfactorily graded and a seed-bed of fine rich soil made, the seed should be sown evenly over the whole surface. To ensure even distribution of seed requires some skill, but it can be best done by the amateur by dividing the seed into two or three equal lots. Then sow the first lot over the whole piece one way, and rake in with a long-toothed iron rake or potato-hook. Then sow the second lot over the whole surface in the opposite direction, and after raking it in sow the remainder diagonally over the whole piece. If

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this is done and the soil is not bunched up in raking the seed in, it will be evenly sown.

If the lawn is shaded with large trees and the ground full of roots, a mixture of two parts June grass, two parts Canada blue grass, one red, one sheep's fescue, one meadow fescue, one perennial rye grass, and one part of white clover will cover the surface better than the ordinary mixture given above.

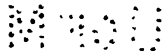
Newly seeded lawns must not be cut with the lawnmower until the grass has formed a firm sod. An ordinary grass scythe, sharp and well handled, should be used the first two or three times the grass is cut, carefully raking off all clippings as soon as cut.

After Care of the Lawn.

With proper care a lawn on good soil should improve with age. Each fall just before the ground freezes a thin dressing of well-rotted stable manure should be spread upon the surface and raked sufficiently to work it down among the roots. Coarse strawy or green manure, often used, is not necessary; it is unsightly and offensive both to those in the house and those passing. Each spring before growth begins a light seeding of the lawn grass mixture should be scattered over all thin or bare places, and a little later, when growth has become well started, an application of nitrate of soda at the rate of 200 to 300 lbs. per acre, or some good lawn dressing, will be very useful. Another light sowing of seed and fertilizer should be applied about the middle or last of August, that they may be washed down to the grass roots by the early fall rains.

Weeds in the Lawn.

Annual weeds like "finger grass," etc., are soon choked out by the above method of seeding and feeding, but biennial weeds like the dandelion, chicory, chick-



weed, money plant, etc., must be dug out with a forked knife or digging tool. After digging out more grass seed should be sown over the spaces where they were removed.

Water a Necessity.

It is impossible to make a perfect lawn upon thin soil without an abundant supply of water especially in dry times. A little water applied to the surface does more harm than good in dry time, as it causes the roots to grow toward the surface and if the dry weather continues the grass plants are very much weakened. Whenever water is applied in a dry time it should be run on in sufficient quantities to wet the lowest roots. A sprinkler run all night in one spot will not be more than enough.

Improving Old Lawns.

Many old lawns exposed to the hot sun, exhausted from want of plant food, or from the feeding roots of large trees, may be improved without much expense, but the perfect lawn cannot be expected under such conditions. If the land is clear of roots or other obstructions, it may be plowed or spaded and renewed as described for the new lawn. If the land is full of fine roots, with the large roots several inches below the surface, with a sharp spade these may be spaded up and shaken out of the soil, a liberal supply of fine manure worked in and seeded, when we may have a good lawn for a few years, after which this process must be repeated. If large roots come near the surface, the lawn must be improved by surface dressing. All obstructions that would be in the way of the lawn-mower should first be removed, any unevenness of the surface where possible should be smoothed off, and then all graded up with rich fine soil into which should be raked a liberal amount of lawn grass seed.

If the surface is fairly level and June grasses or other good lawn grasses are already growing, dressing with manure or fertilizers, seeding liberally fall and spring, and frequent cutting with the lawn-mower will often produce a very good lawn. Of the home supply of fertilizers, poultry droppings and wood ashes make an almost ideal dressing for the lawn.

Lawn-Mowers and Their Care.

With the ordinary grass scythe, well hung and skilfully and frequently used, one may keep a lawn in fairly good condition, but where there is a considerable surface to go over, the lawn-mower becomes a necessity to keep a lawn in the best of order. These tools may be purchased at from \$4 to \$10 each, according to size and make, and when properly used and cared for may be made to last a lifetime. The modern lawn-mowers are made so that as the blades come in contact with the shoe or "bed knife," the two wear off together and are thus self-sharpening. If the set screws for adjusting the shoe and blades are set very nicely and as wear takes place are slightly turned down, no further sharpening need be done unless the blades or bed knife are bent or dulled by striking stones or other hard substances. Much of the ease of running and cutting with the lawn-mower depends upon this adjustment and in keeping all parts cleaned and well oiled. The modern high wheel, ball-bearing machines run more easily than those of older patterns, but neither will work easily unless perfectly adjusted and well oiled.

Flowers Upon The Lawn.

While the flower garden may not add directly to the support of the family upon the farm, like ornamental trees and the fruit garden they help brighten many a



FIG. 32—JUST COMING FROM THE FLOWER GARDEN.

100

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lonely spot and add much of beauty and brightness to our surroundings. The flower garden may be composed of a few little plants growing by the cottage door, a single bed in the lawn in front of the house, a part of the vegetable garden set aside for flowers, or a large and pretentious space occupied by many of the pet flowers of the family, and from which an abundance of blossoms may be gathered to decorate the dining-table or the various rooms of the house when desired, or for sale (Fig. 32).

As with most of the farm and garden crops, much of the success in flower growing depends upon the nature and richness of the soil. The land should be well under-drained if wet, and be made rich by working in fine stable manure, leaf mould or other organic matter. If the flower garden or beds are under large trees, much difficulty will be experienced in preventing their roots from taking up all the moisture and plant food we may apply. This can only be prevented by cutting off every year or two, with a sharp spade, the fine fibrous roots that work up into the beds, and replacing the soil thus taken with rich loam and manure. In this way we may hope to have a good show of annual plants or Dutch bulbs even under the dense shade of the elm, the most avaricious feeder of all our ornamental trees.

Wild Flowers Upon The Lawn.

While in the country we find almost everywhere an abundance of wild flowers, many of the most beautiful of these are seldom seen, though they may be successfully transplanted to our grounds and gardens.

Thus in a rocky, shaded place in a rather moist soil, or under the shade of trees, we may grow the blood-root (*Sanguinaria*), the wake-robins (*Trillium*), hooded violets, ferns, etc. Upon rocks in springy soil we will be

able to grow columbines (aquilégia), saxifrage, snow-on-the-mountain, etc.

Native asters (*A. cordefolium*, *A. undulatus*), golden-rods, etc., will grow under avenues of trees, and plants of these and many other species may be established by transplanting clumps or by sowing the seeds just before the ground freezes in the fall. Other species of asters and golden-rods may be grown in more full exposure.

Native Ferns.—There are few plants that are more satisfactory than many of our native ferns where we have suitable conditions for their growth and where they can be protected from injury by dogs, cats, and poultry. They succeed on a northern exposure and in a moist soil. If the soil is not right it may be easily made so by removing unfavorable soil and adding peaty or turfy soil from swamps or meadows and tamping it firmly in place. Clumps of ferns may be dug in the fall before the ground freezes and planted, or they may be set just as they are beginning growth in the spring. About the only requirements of these plants during the summer are an abundance of water and not too full exposure to the sun. Fig. 33 shows a group of ferns and native shrubs massed with the house for a background.

Lawn Perennials.

There are many beautiful hardy herbaceous perennials especially adapted to growth upon the lawn, among which are, peonias, phloxes, day lilies, golden glow, iris, lily-of-the-valley, hollyhocks, larkspur, yucca, etc. These may be arranged in groups all of one kind, or in mixed groups, at various places about the lawn; in a line along the boundary or the sides of the walks; in masses by the sides of the steps, in a mass to cover the foundation of the house, etc. When the space to be



FIG. 33—NATIVE SHRUBS AND FERNS, WITH BUILDING FOR BACKGROUND.

104

1960

planted is small single specimens here and there about the lawn would be sufficient, and when well established would grow a long time and often spread to very large masses. When the space is larger, collections of the popular perennials will give much pleasure.

Thus a large collection of choice varieties of peonies, phloxes, iris, etc., would be attractive and might become a source of some profit. In arranging shrubs and all kinds of plants upon the lawn it is most satisfactory to have them around the outsides, leaving as broad an expanse of lawn as possible. The lawn and the groups can in this way be more easily cared for. The border of the beds and spaces about each individual tree, shrub or plant should be cut true and smooth so that the lawn-mower may cut close up and the edges need no trimming with the grass hook or edge shears.

Borders along the boundary line may be often planted with good effect of mixed perennials, the taller ones like the golden glow, hollyhock, larkspur, etc., being planted in the rear and others grading down to the lowest in front.

Lawn Annuals or Bedding Plants.

Many annuals or tender bedding plants are grown in beds upon the lawn with good effect. For these the soil must be prepared as for perennials or shrubs. If very dry and much exposed to the sun, such plants as coleus, portulaca, sedums, calendula, cercopsis, lantana, nasturtium, petunia, oxalis, zinnias, French marigold, gourds, castor beans, etc., will generally succeed. When there is more moisture and a deep rich soil a greater variety may be grown. Such plants as geraniums, cannas, dahlias, gladiolus, sweet peas, morning-glories, pansies, forget-me-nots, etc., are especially available.

In a very deep moist soil many kinds of lilies will suc-

ceed, though perhaps they will do better in the flower garden, where the whole space is given up to the cultivation of flowers.



FIG. 34—How Peony and other Herbaceous Perennial Roots are Divided for Transplanting.

In growing shrubs or plants upon the lawn it must be kept in mind that we are trying to grow flowers, grass, and perhaps shrubs and trees, and a very large amount of plant food must be applied to keep up the soil fertility to a point where all will have an adequate supply.

THE FLOWER GARDEN.

The flower garden proper is a space set aside entirely for the growth of flowering plants. In many places it includes shrubs, but as the latter are gross feeders it will be found that herbaceous plants will succeed better by themselves. The flower garden may be set off from one side of the vegetable garden, where some parts may be cultivated by the horse (Fig. 37).

For the best results the soil should be first made fine and mellow. The space should be laid out to a definite plan, with sufficient walks to get about among the plants, and yet the fewer walks we have the more space there will be for plants. Walks, too, being compacted and exposed to the sun will carry off the moisture faster than if it were all a cultivated surface. There is, however, some advantage in having the garden planned



FIG. 35—THE FLOWER GARDEN; BULBS IN BLOOM IN THE SPRING.

100

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with geometrical beds of various sizes, so that plants of different kinds may be put into beds of a size suitable for their growth.

If, however, we attempt to arrange our plants according to size only, we may mix annuals and perennials in such a manner as to cause much confusion, and often a great irregularity in the appearance of the beds. A plan for a flower garden requires a great deal of careful study.

Perennials.

If we arrange all of the perennials in a central border or long bed we may place the tall ones like hollyhocks, larkspur, golden glow, boceonia, boltonia, helianthus, etc., in a line in the middle. If the border is along the boundary, the tall ones should be placed next the boundary line, with those next in height in front and the smaller kinds next the walk, so that the tops of all may be in full view. The special treatment required by perennials, in brief, is to give each kind an abundance of room at planting and to divide frequently the roots of those that tend to spread beyond their allotted space. Thus peonies, iris, golden glow, phloxes, etc., spread so rapidly that the soil about them is soon exhausted, and the plants and flowers make a small growth, when the clump must be dug up and a small portion of it replanted in its place in soil made rich by adding stable manure or by new soil carted in. Fig. 34 shows the method of dividing perennial roots like the peony, etc. The best time for replanting hardy herbaceous perennials is in the early fall, but many of them will succeed if replanted in the early spring. Lilies require an especially rich, deep, yet well drained soil. In a wet soil the bulbs grow small and near the surface, and in a

few years run out. These bulbs need frequent transplanting, which should be done soon after the flower stalk turns yellow.

Biennial Plants.

Many biennial plants like hollyhocks, foxgloves, etc., are especially desirable for the home flower garden, and like many of the perennials may be easily grown from seeds.

Growing Seedlings.—The seed-bed for all hardy herbaceous plants should be in a somewhat shaded place, but not entirely shut off from the sun. The soil should be firm and mellow, with a good supply of organic matter in it from either well decomposed manure, leaf mould from the woods, or composted turf. The seeds should be carefully sown in rows and covered with fine soil two or three times the thickness of the seeds. Until the seeds burst through the soil the principal care will be to see that the surface of the soil does not get dry or that it is not so wet that the seeds will decay. In case of hot, dry weather, a shade of burlap stretched on a frame, lath or brush will prevent too much drying, and if heavy rains occur raised shutters should be placed over the bed. A light covering of sifted sphagnum moss on the surface of the soil will hold the moisture on the surface with no other shade or covering. After the seedlings are up much the same kind of care is needed. If too wet, they will "damp off" (decay); and if too dry, they will wilt down and grow slowly, or perhaps die. If the seeds come up thickly they should be thinned out, so that each one left may have space enough for full development. With many kinds of plants the little seedlings may be transplanted to other similar beds until they reach the desired size for transplanting to permanent beds. In transplanting in dry weather it is

best to water the ground thoroughly quite a little time before transplanting and then shade with boards, lattice or any similar covering for a few days after. If only small numbers of seedlings are to be transplanted it may be done late in the afternoon, when they will have a night in which to recover from the moving.

WINTER PROTECTION FOR HARDY PLANTS.

In northern sections, where there is severe freezing more or less alternating with thawing weather, some precautions are needed to protect the plants from severe injury or even destruction. If this covering is put on too thick, it will cause heating or fermentation and the plants are killed. Coarse hay, straw, pine needles, all make good protection. Coarse strawy manure, if the garden is not in too conspicuous a place may be used, and will afford protection and supply plant-food the following season. All coverings should be removed before growth begins in the spring and before extremely warm weather, as any green foliage under it will be blanched and rendered weak.

Dutch Bulbs.

No class of plants gives so much of beauty for the time and expense incurred as the hyacinth, tulip, crocus, and other so-called Dutch bulbs (Fig. 35). Most of the bulbs used are imported from Holland, whence the name "Dutch bulb," and grow but one year, though many of them will continue under favorable conditions for a great many years from one planting. Thus the tulip, and the daffodil in a rich garden, will continue for a decade, or even a quarter of a century, and produce many good flowers. The hyacinth and crocus are not as lasting, but will continue to bloom freely for two or three years and sometimes longer. They may be planted in the

flower garden, but are much more beautiful in beds upon the lawn with a background of green. The soil should be made rich, deep and mellow, and the bulbs planted as early in the fall as they can be obtained. If the bulbs are to be transplanted from one's own garden they should be dug as soon as the leaves have turned yellow and be kept in a cool, dry place until September or October, when they should be set from four to six inches deep. For the best effect hyacinths should be planted from eight to ten inches apart, tulips and narcissus six to eight inches, and crocuses four to six inches, but may be planted further apart with good results. At the North, where the ground freezes deeply, the beds should be covered with from six to ten inches of coarse stable manure before freezing weather sets in, thus furnishing protection to the bulbs and enrichment of the soil. Before growth begins in the spring, the coarse part of this covering must be removed, or the flowers may not be able to force their way through, while the finer portion is left on the surface to decay.

Window and Veranda Boxes.

While window boxes are more especially adapted to city and village homes, yet as a portion of the family even in the country spends a large part of the time indoors, these boxes will be enjoyed by them, especially when the family gather upon the veranda in the evening. The box should be made of good size, with holes in the bottom for drainage, and filled first with a layer of small stones, in broken pots, and then with rich soil made of about one-third decayed turf, one-third well rotted stable manure, and one-third sand. If in a very dry place a portion of the sand may be left out. Vines to run upward or droop over the box and blooming or foliage plants in the middle will produce beautiful results.

CHAPTER VI

THE FAMILY GARDEN

THE principal aim of this volume is to encourage living in the country, and we hope to show that with only a small garden a meagre income may be materially increased, and by hard work, promptness, and energy, may even be so increased as to furnish a good support for the family.

The various lines of gardening and farming afford work for all members of the family; each one, large and small, may do something for their own support, and thus taking responsibilities early in life learn habits of industry and thrift that they would probably not acquire in any other way. Each member of the family, especially the children, should have their plot where they may plant what they choose and learn that results depend upon their personal efforts. The family garden especially affords an opportunity for the children to assist in picking the fruit, gathering vegetables, pulling weeds, and assisting in many other ways.

The family garden proper, however, may be considered as an additional source of income and comfort of living in the country, and not of a large income in cash, though a small area well cared for will often yield a considerable income from surplus not needed for family use. In succeeding chapters the details of the work of caring for fruits and vegetables are given in full, with the tools needed and how to protect the crops from insects and fungous pests.

The family garden may consist of a very small area, only a bed of strawberries, a few currant bushes, raspberries, blackberries, two or three grapevines, an apple tree or two, a few radishes, lettuce, or other vegetable plants, or it may extend to a much larger area.

Soil and Exposure.

In but few cases can we expect the soil and exposure to be the best for a large variety of garden crops, though fair success may be expected in any ordinarily good soil if it is made rich with stable manure or fertilizer. On the north side of buildings where the sun strikes only in the morning and afternoon very few crops will grow. We may grow radishes, lettuce, cabbage, cauliflowers, dandelions, raspberries and blackberries, and possibly apples, but the vegetables and fruits that require more heat, like the cucumber, melon, corn, pepper, tomatoes, peaches, grapes, etc., must be planted in warm, sheltered places. In open, full exposure to sunlight and air, a greater variety of fruits or vegetables may be grown than if sheltered, though the degree of success with different crops will depend more or less upon whether this exposure is northerly or southerly.

Mixed Plantings.

Large and small fruits and vegetables may be grown readily on the same ground. The large tree fruits may be set wide apart, with the smaller ones in between, the bush fruits in between these in rows, and the vegetables in rows between the latter. If land is abundant and the different kinds of crops can be grown near, so as to be under the eye at all times, these three groups will do better if planted by themselves, that special treatment of fertilizers, cultivation, and spraying may be given to one without applying to all.

In gardens of small size, however, this cannot well be done. Frequently the family garden is a continuation of the lawn or runs up close to the buildings so that such a division would be impossible. Fig. 36 shows a home lot of one acre, where only about one-third of an acre is available for the family garden. In this plan, the west boundary is utilized for growing peach trees and currant bushes, and the south line for cherry trees. The north end of nearly one-third of an acre is devoted to apples, pears, plums, raspberries, blackberries, and strawberries and vegetables. As a partial screen of the garden from the house a line of grapevines is planted south of the garden to be trained to a high wire trellis. Grapevines, too, may be trained to the south side of the house and stable.

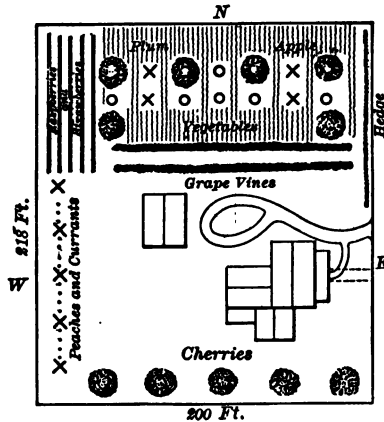


FIG. 36—Plan of Garden and Grounds.

In the plan of the combined garden (Fig. 37) of one acre—218 x 200 feet—the apple trees are set fifty feet apart in four rows, with a row of pear trees twenty-five feet apart between the first and second rows, and peaches, plums, or cherries between the third and fourth rows. Raspberries, blackberries and strawberries are to be set in rows between the second and third rows, or between pears and apples, leaving the other spaces for vegetables. Currant and gooseberry bushes may be set in the line of the apple or other large trees, as they are the least injured by shade. The first row of apple trees

may be set nearer the north and east lines, thus making a clear space on the west of from thirty-five to fifty feet, and on the south of from forty to sixty feet, for small fruits or vegetables. The latter also can be grown between all of the trees for at least ten to fifteen years, or until the trees begin to shade the whole ground. Along the north end may be planted grapevines, asparagus, rhubarb, etc., or the rows of vegetables or small fruit crops may be extended down to the line, leaving only

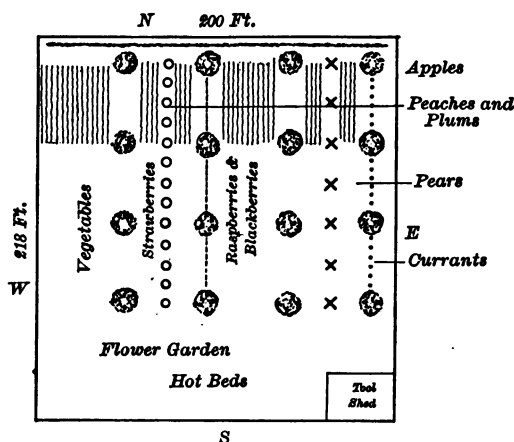


FIG. 37—Plan of a Garden of Fruit, Flowers and Vegetables.

space enough to turn the horse in cultivating. At the south end the wide space may be devoted to flowers, a few hot-beds may be located, and in one corner a small tool house, in which to keep the tools where they can be easily gotten at when wanted, would be convenient. Fig. 38 represents the same area, as Fig. 39, one acre—435 x 100 feet—with trees and vegetables on the east side, the small fruits in a group in the middle and vegetables again on the west side. Other plans might be made giving more space to trees or vegetables or small

fruits as may be desired, but about the following distances should be observed in planting. Fig. 39 illustrates a larger mixed garden of fruits and vegetables. On the left is a large asparagus patch, and on the right, plum trees and currant bushes, while in the middle are turnips, beets, and carrots, all in long rows so that the work of cultivating can be done largely by the horse.

Many experience difficulty in growing vegetables among trees, but planted at the distance given on the above plan it will be many years before the trees will give shade enough to injure these crops, and by the rotation of crops or change of fertilizer crops should succeed and trees be kept in good condition. The continued use of large quantities of stable manure alone often results in a sour and unhealthful condition of the soil that must be remedied by the use of lime (air slacked), hard wood ashes, or slag phosphate, once in three to five years.

To supplement and make stable manure a complete fertilizer, sulphate of potash and slag phosphate—twenty-five to thirty-five pounds of the former to fifty to seventy pounds of the latter—may be added to each cord of manure. This may be mixed with the manure before spreading or be sown upon the land before the manure is worked in. Land among fruit trees should not be heavily manured unless the trees are bearing a heavy crop of fruit or the ground under them is closely occupied with other crops. One of the most common causes of failure

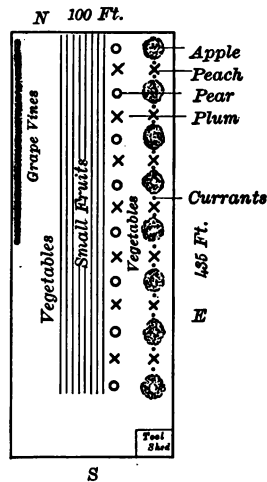


FIG. 38—Plan of a Garden of Fruit and Vegetables.

of fruit trees grown with garden crops is that the trees are abnormally forced and the soil is quickly exhausted by both crops, and for a time they are starved or the moisture is all taken out of the land by the two crops. If crops are grown under trees, the soil should be cultivated frequently to let in sunlight and air and thus keep in the moisture.

All kinds of fruits and vegetables are grown in the family garden, while in the commercial garden—market



FIG. 39—Mixed Garden and Farm Crops.

garden—only a few kinds are grown and but a few varieties of each kind that are in demand in the markets where they are to be sold. We often get much pleasure from testing new fruits and vegetables, and new varieties of old ones, as they come out, but in nine cases in ten the new ones will be of less value than the old standards. The work of testing new varieties we should leave to the experiment stations, which are well equipped for the work.

Fruit Trees in Turf.

The small fruits and vegetables must be cultivated, but many of the fruit trees may be in turf. Thus along the boundary lines, or next the street, cherry trees will grow to perfection if a little fertilizing material is put about them each year. The apple, pear and peach trees may be *made* to grow in any soil that will produce a good turf. Under this condition at planting a large hole must be dug and the tree carefully planted, with fine mellow soil packed firmly about the roots. A space about each tree from four to six feet in diameter should be spaded up and kept fine and mellow during the summer, or the same end may be obtained—*i.e.*, retaining the moisture in the soil—by a mulch of coarse strawy manure, old hay, straw, or other organic matter, spread from three to six inches deep over the space as far as the branches spread. No crops of grass should be allowed to mature on land occupied by the trees, but be cut two or three times each season and allowed to lie upon the ground under the trees. If this is too conspicuous it may be raked up and fine, well rotted manure be raked in under the trees two or three times each summer. In growing fruit trees of any kind it must be borne in mind that unless they are liberally fed, the large amount of growth of root, stem, leaf and fruit will soon exhaust the soil of most of its plant food. If the end shoots of apple, pear, cherry and plum trees do not make a growth of from six inches to two feet the trees are not in condition to produce large crops of choice fruits. One needs to give fruit trees on the lawn more care as to beauty of form than if they were in an orchard, and while the trees are young they should be put into perfect shape by pinching the ends of all shoots that are growing outside the outline prescribed and cutting out any branches that are

crowding or resting upon others. For the general care of fruit trees, small fruits, and vegetables, see Chap. VII, on commercial fruit and vegetable growing.

CULTIVATION OF THE FAMILY GARDEN.

In the accompanying plans all crops are arranged in rows, so that cultivation may be done by the horse. Even if one has no family horse the hire of one for a few



FIG. 40—The Author's "Weed-Killer." Note the Wheel Hoe, Triangular Hoe, Rakes of Two Widths.

hours when needed will be found profitable and will save much time and hard hand work. In the very small garden (Fig. 36), when the rows are short, the hand wheel-cultivator (Fig. 40), will be found of great assistance. There are many kinds of these tools, most of them combined with the seed drill, all of which will do more or less good work. The one shown in the above picture of the author's "weed-killer" (Fig. 40) has the advantage that the high wheel and long handles enable the operator

to stand erect and force the tool along by simply leaning the body forward, and it runs more easily than those with small wheels. With one of these tools one can do almost as good and as much work as the horse, and it would be much more quickly and better done than by hand. Many kinds of tools and attachments come with each cultivator—fine teeth, thin blades for shaving off the weeds, plow blades for hilling, etc., which are interchangeable and may be quickly changed.

The triangular hoe shown in the picture (Fig. 41) is unlike the common or "sunnyside" hoe in the market, in that it is made from the common thin-bladed corn hoe with a nine or ten inch blade about three inches wide, the back or curved

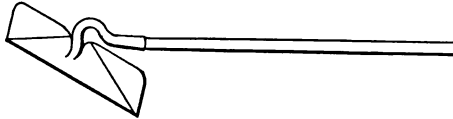


FIG. 41—The Triangular Hoe ; How Made.

part being cut off as shown in the cut, with a sharp file or cold chisel. This makes a long cutting edge for shaving of the little weeds on the surface, with long, slender points that work in among closely planted crops, and stirs the soil more easily and deeply than the common square hoe generally used. The best time for killing weeds is just as they are breaking through the ground, and in a light soil this may be done quickly with the common garden rake between the rows and a small one with four or six teeth to work in and among the hills. With the wheel hand-cultivator, the "weed-killer" hoe, and rakes of two sizes, a large area of garden surface may be kept free from weeds and the soil light and mellow.

Summer Fertilization.

It is said that the Japanese are the most skilful people in the world in the use of fertilizer. They utilize all possible fertilizing materials and apply frequently, working

it into the surface close to the roots, and in our garden work we may gain much by following their methods. If during any part of the season our crops are not growing as we would have them, a little nitrate of soda, poultry dropping, or other quickly soluble fertilizer, scattered close up to the rows and worked in with the rake or hand-cultivator, will cause a great improvement. These fertilizers, however, should not be applied late in the season, as they might cause late and immature growth, like unripe onions, coarse squashes, etc.

Cold Frames and Hot-Beds.

While these structures are more or less used in all kinds of garden work, they are especially useful in the family garden. When properly made and skilfully managed a very small area covered with glass may be made to produce a large amount of garden produce out of season and extend the season of supply at both ends (Fig. 77).

For the best results preparation should be made in the fall by excavating a space from one to two feet deep, six feet wide, and the length of the number of sash to be used, especially at the North, where the ground freezes deeply. This space is filled with leaves, and when it is desired to start the beds in the spring the frames are adjusted and the sash, mats and shutters put on. After the bed is well warmed up by the sun's heat, the leaves are thrown out and heating manure put in their place. The manure for heating should be fresh and unfermented and be thrown into a large rounded pile in a cellar or shed, where it freezes very little or not at all. When well warmed up, and steaming vigorously, the pile is thrown over and thoroughly mixed and left to heat again. When this gets decidedly hot it is put into the hot-bed from six inches to two feet deep, according

to the season and the crops to be grown. In the middle of winter the full two feet will be needed, while in April only a little will suffice. On top of this manure, which must be trodden firmly, from four to six inches of fine rich soil should be placed to within ten inches to one foot of the glass. A thermometer should be placed in the heating material and when it has reached about 100° and receded to 80° or 90°, seeds of tomatoes, peppers, egg-plants, cucumbers, corn, etc., may be sown, and when it is down to 70° or 80°, seeds of radishes, cabbage, cauliflower, beets, onions, etc.

Hot-beds are used for forcing lettuce, radishes, etc., and starting plants of cabbage, lettuce, cauliflower, beets, tomatoes, and onions, to be transplanted into the open ground. Many other plants besides those mentioned above may be forced in the hot-beds, such as peas, beets, onions, beans, cucumbers, etc., but the yield is so small and the time required for their maturity so great that there would be no profit—only an expensive luxury—in trying to compete with truck-growers at the South, who with modern methods of transportation can put a fairly good product into our markets at a very low price.

For the cold frame no excavation is needed, only the leaves or other covering put on in the fall to keep the ground from freezing so that the space may be quickly warmed up when desired. No bottom heat is used; all the heat is secured from the sun and is held in the beds by glass, mats and shutters.

Much skill must be exercised in running these frames. The sash should not be opened in the morning until the sun is well up, and should be closed before they cool off too much in the afternoon. Mats and shutters must be used to cover the frames at night and in very cold weather. Thermometers should be kept in each frame

and frequently examined. For radishes, lettuce, celery, cabbage, cauliflower, beets, onions, etc., a day temperature of 50° to 60°, and at night 40° to 50°, will give the best results. For corn, cucumbers, peppers, tomatoes, etc., the temperature should be 50° to 60° at night and 60° to 70° during the day.

Starting Seeds.

In the hot-bed and cold frame the conditions for successful germination may be more certainly controlled than out of doors, as we can prevent drying out of the surface or too much moisture, either of which will generally destroy seeds just beginning to germinate. We can also control the temperature. In the cold frame we generally cover the seeds more thinly than in the open air, by sifting over them a little soil two or three times the thickness of the seed. If the soil is rather moist, simply press the soil over the seed with the hand or with a block, but if it is decidedly dry, the soil may be settled by sprinkling with water. The critical time with seeds is just as they are breaking through the ground. If too dry at this time the seedlings will wilt, or if too wet, they will decay (damp off). For the further discussion of this subject see Chap. XI, on market gardening.

Poultry and the Family Garden.

These two elements of the small country home may be antagonistic forces, or they may be mutually beneficial. Among large fruit trees poultry of all ages may be of great benefit in keeping down insect pests, and may be kept in runs among them the year around. Among grapevines, raspberries, and blackberries, they may be allowed to run until the fruit begins to color. Among the currants and strawberries

small chickens may be allowed to run if too many are not kept in one place, but must be removed as soon as they begin to pick off the fruit.

The vegetable garden must be fenced in or the poultry kept in an enclosure where they cannot get into the garden, for even small chickens will scratch and pick the leaves from seedlings just coming out of the ground.

CHAPTER VII

FRUIT GROWING

THE person who moves into the country for the purpose of earning a living, must do it with the understanding that the business of farming in any of its branches—dairying, fruit growing, market gardening, etc.—must be conducted on the same principles as any other business to succeed.

While Nature is often lavish in her bounty, and seems to give a large increase for our efforts upon the soil, average results will show that we are as much dependent upon correct methods, skilful management, and hard work for a good return from our labor as in any other calling.

For the best results we must understand the nature of the soil, the needs of each crop to be grown as to soil and exposure, and the special care required, from the planting of the seeds or plants to harvesting and marketing. To the novice we would say: Go slow. Do not risk all in your first efforts. Don't put all of your eggs in one basket. The business of farming must be learned just the same as any other business. Do what you can thoroughly, be prepared for disappointment, but expect and work hard for success. Be a good scholar, and learn from every possible source. Get acquainted with successful farmers, fruit growers and gardeners in your neighborhood. As a rule they are good fellows and always ready to assist a beginner in every possible way. Take their advice, but adopt only that which applies to your immediate conditions.

Equipment Required.

The equipment required for successful fruit growing includes suitable soil and exposure, tools for the cultivation of the soil, saws and shears for pruning, ladders for gathering the fruit, space for preparing the fruit for market and storing until sold. A spraying outfit is also needed in every section of the country to protect our crops from insects and fungous pests.

Soil.—In most sections of the Eastern United States, only small areas of one kind of soil may be found. The land is so tumbled about that we may find clay, loam, sandy or gravelly soil, some with slopes in every direction, so that suitable land in small areas for any of the hardy fruits may be found in almost every direction.

Plows.—For working the land a large plow for breaking up and a small one for working in among the trees and small fruits are needed. If the fruit plantations are small several owners may unite and own one sulky or other kind of large plow.

Harrows.—Much labor is saved in fitting and working the land among trees by the use of harrows. The ordinary wheel, shears, or spring-tooth harrows will do good work around trees while small, but when the branches spread and droop to the ground a special form of harrow, in which the blades are spread apart, must be used. This enables the horses to go outside the branches while the harrow hugs in under them.

Cultivators.—Most of the harrows in use are made for two horses, but as one horse can generally do all the work on a small fruit plantation, the cultivator becomes the chief implement for working the soil between the trees and among small fruits. Many of these tools are provided with several kinds of teeth, wings and other combinations, like the Planet Jr., Iron Age, etc. The

spring-tooth cultivator is especially useful in stony soil, its action being lifting rather than scraping or dragging, as with many others. With the harrow or cultivator, starting early in the spring when the ground is soft, the land may be kept in a fine, mellow condition without the use of the plow.

Weeders.—After the surface of the ground has been made fine and mellow the weeder will keep down all weeds if run frequently enough, and with it spread wide one can go over a large area in a short time. The weeders with straight teeth do better work than those with curved teeth, though the “adjustable weeders” which have curved teeth are convenient for running between narrow rows.

Spades and Spading Forks become a necessity in digging and planting trees and bush fruits, and in digging about young trees or in places where the plow will not reach. The spading fork is more serviceable, and is easily used where the soil is full of small stones or coarse organic matter.

Hoes and Rakes.—While we may do nearly all of the work about small trees and small fruit plants with the cultivator, there will be some spaces where the hand hoe must be used. As about all of the necessary stirring of the soil is done by the cultivator or harrow, the only use for the hoe is to cut up small weeds that grow around the hills, and this hoe should have a thin, sharp blade for cutting only. The triangular hoe shown in Fig. 41 will be found the most satisfactory for all kinds of garden hoeing except hilling up, and that can generally be best done with the cultivator or the hand wheel-hoe.

For stirring the soil among the rows of garden plants where the cultivator cannot run, the steel-toothed garden rake is a tool that will do more work than the hoe.

Two rakes are needed, one with twelve to fifteen teeth to work between the rows and one with four to six teeth to work in between the plants and hills. The wheel hand-cultivator shown in Fig. 40 will be found useful among the small fruits. With the large wheel of this hoe one can run it easily and do much better work than with a smaller wheel.

Trowels.—For transplanting strawberry and other small plants one cannot get along without the garden trowel. Those with the shank welded to the blade are better than those with the shanks riveted.

Saws.—In growing tree fruits saws are necessary, for while we should never make a cut upon a tree without some good reason, there are many times when we must prune more or less. For cutting off large branches a saw with rather large teeth is needed, the teeth pointing forward a little, like the splitting saw, and set rather wide. For cutting small branches, grafting, etc., a saw with fine teeth is better. The Paragon saw has a curved blade, the teeth on the inside pointing toward the handle while those on the outside point toward the end. This enables the pruner, when in the tree or on the ladder, to reach a branch over his head or at arm's length in front and cut without bearing down, simply pulling the saw forward, while a branch lower down may be cut by running the saw forward and downward. A long slender saw is very convenient for cutting when two branches come close together, or if placed upon a pole to cut small branches that could not be reached from the ladder, and for marking from the ground branches that are to be cut by men in the trees.

Pruning Shears and Hooks.—Pruning shears with handles two to three feet long are very serviceable for cutting stout canes of raspberries, grapevines, and low branches from fruit trees. Pruning hooks with long

handles are indispensable for cutting the ends of long shoots in the tops of trees, and cutting off clusters of insects and their nests. The thorny dead canes of the blackberry plantation are best cut out with a hooked blade attached to a fork-handle about four or five feet long.

The hand pruning shears are needed for pruning vines, shrubs, currant bushes, and the ends of raspberry and blackberry canes, etc.

Horses and Wagons.—The labor conditions are such at the present time that little or no profit can be made from farm or garden crops if we have to hire much help; therefore we must do all that is possible with horse power, and horses and wagons are needed upon the farm both for pleasure and profit. Wagons are needed to draw supplies and carry produce to market. For soft, perishable stuff a spring wagon is useful, but for carting manure, and heavy farm products, a wagon without springs is better. By using bolster springs a wagon may be quickly changed from one to the other. The manure spreader, mowing machine, horse rake, and weeder, are desirable even upon a small place and become a necessity when a large business in general farming is done.

Packing and Storage Room.—With almost all kinds of fruit some place is needed in which to prepare it for market or store it for a greater or less time after it is gathered. For small fruits we need a place where they can be put into a cool atmosphere after being picked and be kept until shipped. This may be a cool cellar or basement room on the north side of the house or other building, or it may be a cool room with ice stored overhead or along the sides. The former, however, is better, the atmosphere being dry—while the latter will often be quite moist. For storing fruit and vegetables during the

winter, a cellar where the temperature can be kept near freezing is desirable. It should be slightly moist to prevent wilting of fruit or vegetables. If the cellar is too dry, fruit and vegetables may be kept from wilting by storing in forest or other tree leaves. If the latter, however, are too moist and the cellar is very warm they will heat and cause decay.

FRUIT GROWING AS A BUSINESS.

Fruit growing has many attractions. It is a business in which we often hear of large profits being made, yet when we come to sum up the average we find that failures are frequent and the business is not more profitable than many others. It, however, has many attractions aside from the financial question. The fruit trees in bloom and trees and vines in fruit are especially beautiful; and the study of varieties, and watching the development of the plant or tree from small beginnings, keep us interested in things outside ourselves. When properly and skilfully conducted, large profits may be made from all of our fruit crops.

The markets of our country are among the best in the world. Our people can and do pay better prices for choice products than any other people. Yet the supply of choice fruit that comes to our markets from all parts of the world is so great that prices do not rule high. Choice fruit, however, will always sell at good prices, and when economically grown there is often a large profit in growing it.

The Apple.

This is the most important tree fruit of the temperate zone. It is grown from Mexico to Northern Canada and from the Atlantic to the Pacific. Apples grown from New York City to Northern Canada and from Nova Scotia to Michigan are of better quality than those

from any other section of the world. Apples from Colorado, Oregon, Washington, Nebraska, and other extreme Western states are often of large size and beautiful color, but are coarse in texture and of poor quality. The apple is very prolific, single trees frequently yielding fifteen to twenty barrels of fruit. Two acres are known to have produced fruit in one season that sold for \$500. There are within the limits of the city of Worcester, Mass., seven young trees that produced one hundred and seven dollars (\$107) worth of fruit in a single season. Three trees in Williamsburg, Mass., are reported to have yielded sixty-five barrels of apples.

The Best Soil.

The soil best suited for the growth of the apple is a strong moist loam, a clay loam, or a clay soil, well underdrained. The noted apple growing sections of the country are Nova Scotia, Maine, Canada, northern New England, Champlain Valley, Vermont, northern New York, and Michigan, and other localities where the soil is "good grass land." The best results are obtained where the land is deeply fitted and kept thoroughly cultivated. If it is not in good condition to start with, it may be cheaply made so by growing and plowing under cover crops like clover, rye, peas and oats, soybean, corn, peas and barley, etc., using from 300 to 500 pounds of some good grain fertilizer per acre, or a light dressing of manure, if the land is very poor. Thus upon land plowed the spring previous to planting we may sow very early peas and oats, one and one-half bushel of the former, two of the latter. When the peas are in bloom and the oats heading out plow under and at once sow buckwheat. Let this grow until the first to middle of August, then plow under and sow peas and barley. This latter crop will grow until severe freezing weather, and should be

allowed to lie upon the ground until the following spring to protect it from wind and washing. If the growth is a good one no weeds will start early in the spring and it may be plowed under at any time up to the middle of May or when one is ready to plant the trees. This treatment will put the land in condition for a quick growth of trees, and any crop that may be planted among them.

Selection and Arrangement of Trees.

Young quickly grown, No. 1 apple trees, two years old, should be selected. If these can be found in nurseries near at home they are much to be preferred to those bought from distant nurseries, there are so many risks of injury in transporting them a long distance. Only well known and reliable nurseries should be patronized unless one can see the trees before purchasing. Fall is the best time for planting apple and pear trees, while the peach, plum and cherry had better be planted in the spring.



FIG. 42—"a" No. 1 Two-Year-Old Tree as it comes from the Nursery; "b," the same Properly Pruned for Planting.

In the orchard it is generally best not to mix the different kinds of fruits, but peaches may be set in among

the apples, as they are short lived and an income may be expected after from four to six years, that will materially aid in paying expenses, and under favorable conditions might pay all expenses to date. In the accompanying scheme standard varieties of apples like the Baldwin, King, Spy, etc., are planted forty to fifty feet apart, with "fillers,"—varieties that come into bearing early and make rather small trees, like Hubbardston, Wealthy, etc.,—set in between at twenty to twenty-five feet distance. Upon rather light land where the trees will not grow to very large size this distance may be forty feet for the permanent trees and twenty for the fillers. If the land is suitable and is on an elevation, with a north or western exposure, peach trees may be used as fillers, but if on a southern exposure they will not do as well unless the elevation is quite high above the surrounding land.

At these distances crops of vegetables or any other hoed crop may be planted among the trees for six to eight years, though these crops will not prove as profitable among the trees as in open fields by themselves.

Cultivation.

If hoed garden crops are grown among the trees this is all the cultivation needed, but fertilization material sufficient for both crops must be applied or the trees will suffer. Frequently, however, it may be best not to grow any crop under or between the trees, in which case the cultivation must be wholly charged to the orchard and the cost reduced to the lowest possible point. The modern orchard wheel shears or spring-tooth harrows are so arranged that the blades are carried out by a spreader beyond the track of the horses and will work up close to the trees without endangering them with the eveners or whiffletrees. With one of these mod-

ern tools run frequently, the work of cultivating an orchard, killing all weeds, and keeping in the moisture in dry weather, will be reduced to a very low figure.

A Cover Crop.

This cultivation should be kept up from the beginning of growth in the spring until about August 1st, when peas and barley may be sown, which will lie on the ground during the winter, to protect the land from blowing and washing, and can be plowed under at any time up to June. The advantage of this crop over clovers, rye, or vetch, is that it makes no growth during the spring to carry off moisture or plant food, which might result in much injury in a severe drouth during April or early May. Rye or crimson clover makes but little growth at the North until the middle or last of May, and would produce a very small amount of organic matter to turn under until later in the season. Red clover makes a good growth in the fall and supplies a large amount of organic matter in top and root for turning under. With the above treatment no manure and little fertilizers need be applied to the trees until they begin to bear.

Cost of an Orchard.

The estimated cost of an apple orchard per acre may be stated as follows:

FIRST YEAR BEFORE PLANTING.

Plowing.....	\$3.00
Peas and oats (seed).....	3.00
Peas and barley (seed).....	3.50
Seeding.....	2.00
	<hr/>
	\$11.50

SECOND YEAR.

Plowing and harrowing.....	\$ 3.00
Apple trees 109 @ 10c.....	10.90
Planting	2.00
Harrowing.....	5.00
Harrowing and seeding with peas and barley	4.00
	<hr/>
	\$24.90

THIRD YEAR.

Plowing and cultivation.....	\$5.00
Cover crop of peas and barley.....	4.00
Pruning and spraying.....	3.00
	<hr/>
	\$12.00

SUCCEEDING YEARS.

Cultivation and cover crop.....	\$10.00
Spraying and pruning.....	5.00
	<hr/>
	\$15.00

Cost with garden crops in orchard:

FIRST YEAR.

Fitting land.....	\$11.50
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SECOND YEAR.

Plowing and harrowing.....	\$3.00
Trees 109 @ 10c.....	10.90
Planting	2.00
	<hr/>
	\$15.90

SUCCEEDING YEARS.

Spraying and pruning.....	\$5.00
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Cost with peach trees as fillers:

Apple trees, 30 @ 10c.....	\$3.00
Peach " 80 " 5c.....	4.00
	<hr/>
	\$12.00

Apple trees will cost from \$8 to \$10 per hundred and peach trees from \$4 to \$8 per hundred, according to size and quantity purchased, and the difference in cost of establishing an orchard with apple trees or peach trees as fillers is about \$3.90.

Thus it will be seen that the cost of establishing an orchard on land not given to other crops for the first eight or ten years, after which it is expected to yield some income, makes it a question whether or not such an enterprise with apples alone would be profitable unless undertaken upon a large scale, when the proportionate cost might be largely reduced. With peach trees as fillers or when crops are grown among the trees there is a much greater chance of profit.

Apple Trees in Turf.

In strong, rich, moist land, when an abundance of manure or mulching material is available, apple and even peach trees may be successfully grown in the turf. This lessens the cost of establishment, but unless the conditions are especially favorable the trees will not make as rapid growth as under cultivation. Where trees in turf can be made to produce a vigorous growth the fruit is generally more brilliant in color, of better quality, and will keep longer. This method, however, is not to be recommended unless the above conditions can be fully met. By this method land that cannot be used for any other purpose except forest growth may be made to produce moderate crops of most beautiful and highly colored and flavored fruit.

Any coarse organic matter like swamp hay, brakes, fine brush, forest leaves, etc., may be used as a mulch, but it must be drawn away from the trunks of small trees in the fall to prevent mice from feeding upon the bark. If the land is covered with leaves, brush and

grass, it is best to paint the trunks of young trees with freshly slacked lime wash in which is mixed a tablespoonful of Paris green to one gallon of the lime wash. Another danger to the trees under this condition is from fire, which if started during high winds might destroy many trees. The mulch should be placed on the windward side of the trees, which in most sections of the Eastern United States is the east, when the flames would



FIG. 43—A Tall Apple Tree Before Pruning.

be blown away from them. If placed on the north or west sides the flames would be blown toward them.

Renovating Old Trees.

Throughout the older settled portions of the United States may be found old trees in almost every stage of decline and of a great many varieties, producing more or less fruit but of so poor quality as to be of little value. These trees are, therefore, neglected and serve only as

breeding places for all sorts of insects and fungous pests. Where the trunks and main branches of these old trees are sound the tall spreading branches may be headed in, the lower ones thinned out where needed, and in a few years a more spreading and vigorous head produced.

If the varieties are such as are not in demand vigorous trees may be grafted and in three or four years made



FIG. 44—A Tall Apple Tree After Pruning.

to produce Baldwin, Wealthy or any other variety for which there is a good market. If the trees are weak in growth the ground under them should be first fertilized, and the head cut back so as to produce a vigorous growth.

Fig. 43 represents an old tree before being pruned.

Fig. 44 shows the same old tree after pruning.

Fig. 45 shows the same old tree regrafted.

Grafting.

Grafting is work that any one at all skilled in the use of a knife can do, yet it will be found that to graft over large trees will require much time and the young trees should have attention first. The process of grafting is



FIG. 45—A Tall Apple Tree at the End of the First Season After Heading Back.

fully illustrated in most works upon fruit culture but a brief description may be desirable here (Figs. 46, 47, 48).

Tools for Grafting.

For this work one needs a fine-toothed saw to cut off the stock, a large knife to pare the end of the stock, a grafting chisel to split the stock, a small sharp knife to cut the scion, and wax for covering the wound. Beginning at the top of the tree, stocks from one to three inches in diameter are cut off squarely, at a distance from the centre of the tree that will make a good formed head.

These stocks are pared smoothly; then, beginning at the highest so that the grafts inserted will not be broken out, the stocks are split with the chisel, and the wedge inserted to hold open the cleft until the scion is inserted, as in Fig. 46. The scion (a part of a shoot of one year's growth with two buds upon it, cut from the outside of the tree,) is then cut wedge-shaped in two directions and inserted into the stock so that the inner bark of both scion and stock shall be in contact as much as possible. When the scions are in place the wedge is knocked out and the stock



FIG. 46—Grafting : How the Stock is Cut and Split.

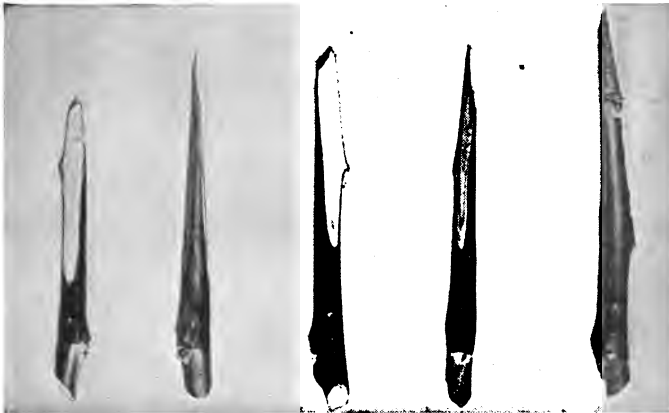


FIG. 47—Grafting : How the Scions are Cut.

presses the two firmly together. Should the stock be less than an inch in diameter, it is generally best to bind it firmly with raffia fibre or other soft flat-tying material. When all is done every cut surface must be covered with wax to keep out air and water (Fig. 48).

Grafting wax may be purchased of any dealer in horticultural supplies, or may be made of four parts rosin, two parts beeswax, and one part tallow or linseed oil. When these are thoroughly melted together in a kettle and cooled a little the mixture may be poured into a pail of water and then drawn out in sticks like molasses candy, or it may be allowed to become nearly hard and



FIG. 48.—Grafting: Stock After the Wax Has Been Put On.

then cut out of the kettle and drawn. For grafting in cold weather a little more oil or tallow may be used. In covering the wounds the wax is drawn out in small strips and pressed firmly over the split on each side, over the top of the cleft, crowding it down into the cleft, and a little on the end of each scion. To keep the wax from sticking to the fingers a little soap or beef or mutton tallow may be rubbed over the hands.

Time for Grafting.—For the apple and pear the best time is just as the buds are beginning to swell. For plums and cherries the work should be done a week or two earlier. Fig. 49 shows a tree one year after grafting, Fig. 50 one three years after grafting.

Pruning or regrafting alone, however, will not renovate old fruit trees permanently; more plant food of some kind must be applied. A heavy mulch of straw, coarse manure, forest leaves, brush, etc., spread out as far as the branches reach, or plowing and cultivating must be given them, or they will relapse into their old condition in a very few years. To produce high color and fine quality in our fruit some potash is needed in addition to the fertilizing elements in our stable manure and mulch. This may be wood ashes from one-half to

one ton per acre or 300 to 500 pounds of sulphate of potash per acre. If the trees are making a slow growth of wood from 100 to 300 pounds of nitrate of



FIG. 49—An Apple Tree One Year After Grafting.



FIG. 50—An Apple Tree Three Years After Grafting.

soda sown just as the buds begin to swell will force the growth of wood early in the season and produce an early ripening of the fruit in the fall.

Pruning Fruit Trees.

All fruit trees will grow out of shape and condition for producing the most and best crops of fruit if left to themselves, and they may be either improved or injured by pruning. The apple orchard of the Eastern United States as a rule has been seriously injured by pruning. We have usually planted too closely, then as the trees grow together the lower branches become weak and we cut them off, and the process is kept up until we have but a few long bare branches stretching high into the air (Fig. 51).

The sap moves slowly in these long bare branches, the leaves are small and the fruit imperfect in color, small

and of poor quality. The remedy for this is, first, for young trees, to plant further apart, and for old trees,



FIG. 51—An Old Orchard Pruned from Below Only.

to thin out where too close and cut back the long branches and thus force the growth into the lower branches as shown in Figs. 52, 53 and 54.



FIG. 52—An Old Orchard Before Pruning.

In an orchard with trees planted twenty to twenty-five feet apart, when the branches begin to touch we may obtain just as much fruit if one-half of them are cut out,

and those remaining will go on improving, while if we do not thin out all will be seriously injured in a very



FIG. 53—An Old Orchard After Pruning.

few years. Fig. 55 shows a perfect tree produced by an abundance of room and heading in from the top.



FIG. 54—An Old Orchard the Autumn After Pruning.

Don't Cut Away all the Sprouts Inside the Tree.

Most trees that have been pruned until the bare branches stretch high in the air are making a great effort to overcome the injury by throwing out numerous sprouts and suckers. These should not *all* be cut off,

but where there is space above for them to develop they should be allowed to grow, when in a few years they



FIG. 55—A Perfectly-Shaped Apple Tree,
Produced by Cutting In the Tops.

become the best part of the trees and we may then thin out some of the old wood that has become weak. If a few of these sprouts are allowed to grow each year we will have an entirely new head in a very few years. Fig. 56

shows a convenient ladder for working among low trees.

Varieties.

There is no section of the country where too many worthless varieties of apples are not grown. There is hardly a state in the union where more than five or six kinds can be grown with much profit. To decide what varieties one had best grow one must consult the markets, and the neighboring growers as to what they find the best adapted to their soil and most profitable. In old orchards we must get rid of the worthless varieties by cutting them down or regrafting, as there can be only loss in caring for them.

It is impossible to give a short list that will be best for all localities, but the following is suggested as one that includes varieties of especial value in many localities:

Summer.—Astrachan, Williams, Yellow Transparent.

Autumn.—Gravenstein, Wealthy, MacIntosh, Fall Pippin.

Winter.—Baldwin, Hubbardston, Spy, King, Sutton, Roxbury Russett.

HARVESTING APPLES.

Much of the value of any fruit crop depends upon how it is harvested. For first-class fruit it must be hand picked, though with low-headed young trees and a mulch on the ground we may let such varieties as Astrachan, Williams, Wealthy, Gravenstein, etc., drop to the ground, and sell them at good prices for immediate use.

For harvesting apples a variety of lengths of ladders is necessary, according to the character of the trees. The shorter the ladder that can be used the better and quicker will the picking be done. The tripod ladder shown in Fig. 56 is a very cheap one and easily constructed, one that will stand anywhere and occupies little space when the leg is folded in. The leg is bolted in between the two side pieces, making a very strong but light ladder.

Small baskets holding from a peck to a half bushel with a bale are necessary to pick into while in the tree.

Time for Harvesting Apples.

Early apples to be sent to market must be picked as soon as fully grown but before they become mellow. Such varieties as Astrachan, Williams, Gravenstein, etc., as previously mentioned, if intended for a local market, may be allowed to fall upon mulch if the trees are not too high. When ripened in this manner the fruit is more brilliantly colored, of better quality, and is more cheaply picked from the ground than from the trees.

Winter varieties should not be picked until fully grown and well colored, but before severe weather, which in the New England states ranges from September 20 to October 20, according to the season and the variety.

To keep well, apples should be put into a cool place as soon as possible after picking. This may be a north shed,

or a north room in the basement of the dwelling-house, unless one has a cold-storage room cooled by ice or other artificial means. They may be picked and put into clean dry barrels or boxes and put at once into the shed or cellar stacked one above another, or put in shallow bins.

To keep the temperature low where there is no artificial means of cooling, doors and windows may be opened on cold nights and closed during the daytime.

The temperature may be reduced to the right point at start by using a mixture of salt and ice (ice cream freezing mixture), in large tubs or boxes. A half ton of ice and 50 to 100 pounds of salt will cool quite a large space down to 35° to 40°, at which apples will keep until cold weather comes on, when the temperature may be reduced to 32°, which is about the best point for keeping this fruit.

The Best Package for Apples.

For shipping apples to distant markets, the barrel seems to be the most in favor, in most sections of the country, but for local markets in Eastern United States the bushel box is very largely used. This is practically a return package. You deliver your fruit and get an empty box in return or are paid its value. As ordinarily marketed the fruit is not faced but the box is filled a little above the level with the top of the box so that they cannot be stacked one above another. By the use of a cover facing may be done, the cover being nailed on and the bottom taken off; the fruit is faced on this cover, and when the box is full the bottom is nailed on. By this method the apples are more or less bruised, but by putting a cushion of corrugated paper under the cover this may be obviated. The box is much more easily handled, occupies less space in shipping and storing, and supplies nearer the amount of fruit the con-

sumer demands. Extra fancy fruit in boxes often sells for from \$1.50 to \$3.00 per bushel box. The method of packing and heading apples in barrels is shown in Fig. 98.

Insects Attacking the Apple.

The most injurious insects attacking the apple are the codling moth, apple maggot, and apple borer. The codling moth is the insect that makes the wormy apples. The eggs are laid upon the apple or leaves near it, from which when hatched comes a very minute worm that enters the apple at the blossom end, feeding inside, and when mature coming out at some other point. The remedy for this pest is Paris green or arsenate of lead applied in the Bordeaux mixture,—copper sulphate and lime—(see experiment station bulletins), first, just as soon as the petals of the flowers have fallen, and second, a week or ten days later. Much may also be done to keep this pest under control by picking up all dropped fruit and feeding it to pigs or other animals.

The apple maggot, the insect that works so abundantly in sweet and mild-flavored fruit, causing decay in a very short time, cannot be destroyed by any spraying material, but its depredations may be greatly reduced by feeding the fruit as mentioned above for the codling moth.

The apple borer attacks the trunk, especially of young trees. The first year it feeds upon the inner bark and sap-wood near the ground; the second year it works in deeper and makes a turn upwards, when it feeds for a year and then works out to the bark, where it escapes as a perfect insect. The remedy for this pest is to examine the trees in May and again in September. The young larvæ will be found by paring off the outer bark where the chips are thrown out by the young borers,

and killing them with a knife. The older borers must be killed with a flexible wire forced into their holes. If, however, all of the young borers are destroyed in May and September there will be no large ones to kill in this way.

All holes made by the escaping insects should be filled with putty or thick paint to prevent decay of the wood around the injured parts. The San José scale in some sections is proving a serious menace to apple growing. It is destroyed by the lime and sulphur mixture and by some of the soluble oils. For further directions for the control of these pests see bulletins of experiment stations.

Blights, Rusts, Scab, Etc.

Of the many fungous pests injuring the apple, the scab, a dark olive growth on the surface of the fruit, is the most destructive. This growth comes upon the leaves and fruit at any time from May to October, when we have much moist, cool weather. It is destroyed by the Bordeaux mixture. The two sprayings for the codling moth early in the season will prevent the growth of the scab, after which we must spray about the last of July and the last of August. When the weather is wet at picking time it is sometimes necessary to spray just before picking to prevent the growth of the scab in the barrels.

DWARF APPLES.

Some twenty-five or thirty years ago much interest was manifested in Dwarf Apples. Everybody was going to plant their front yards, back yards, and all the waste places about their homes, and have apples for home use and for sale. These trees were grafted upon a slow-growing stock called Doucin and Paradise.

Many trees were sold by nurserymen and planted in

the home gardens, where they thrived for a time, but owing to the care they required and their failure to give the results promised, interest soon died out and in ten or fifteen years hardly a dwarf apple tree could be found. Within the past three or four years the interest in dwarf apple trees has been revived but that these will prove of any permanent value will require at least a decade to decide. If in the small yards of our city and suburban homes dwarf trees should continue to grow for a few years and produce a fair amount of fruit, they will be of much value; but we can hardly expect them to compete with standard trees for the production of fruit for commercial purposes.



FIG. 56—A Convenient and Cheap Ladder for Working on Low Trees.

CHAPTER VIII

THE PEARS, PEACHES, QUINCES, PLUMS, APRICOTS AND NECTARINES

THE PEAR.

WHILE the pear is not as extensively grown as the apple, there is a large demand for choice fruit and when well grown it is a paying crop.

It thrives best in a deep rich loam, though it succeeds well in a clay soil if well underdrained. Like the apple, the fruit is of better color and quality, and the trees are less injured by insects and fungous pests, if planted on high elevations in full exposure to sunlight and air. Pear trees are more subject to injury from insects and fungous pests than the apple, and for this reason, perhaps, we do not often see old pear trees, or orchards from fifty to one hundred years old, as we do of the apple. Being smaller in size than the apple it is, however, more easily sprayed and pruned and with good care ought to last longer.

Kinds of Trees; Preparing for Planting.

No. 1 trees two years old are best for planting and they are prepared and planted in the same manner as the apple (see page 137). The after care, cultivation, fertilizing and pruning are also practically the same, except that in pruning the leading centre shoots of young trees must be cut back more severely to force an early low branching and fruiting. Much growth of wood will

be saved if the shoots are pinched off in the summer than if they are allowed to grow and then cut off.

Pear trees are planted from twenty to twenty-five feet apart, according to the variety for standards, and twelve to fifteen feet for dwarfs, though if the latter are set below the point where grafted or budded roots are formed from the pear stock the tree becomes a standard and will need the wider space first mentioned. Dwarf trees are sometimes very satisfactory if planted on very heavy soil, as the quince root upon which they are grafted grows best in such soil. Some varieties succeed better upon the quince stock than others, and only those that do well on this stock should be planted as dwarfs.

Renovating Old Trees.

The majority of pear trees in the older sections of the United States are very much in the condition of the apple trees—neglected, unpruned, and unsprayed, and producing fruit that hardly pays for harvesting. To put them into condition to produce fruit that will bring a fair price in the markets, we must first reduce the amount of old wood which is covered with fruit buds just as we would with the currant or gooseberry bushes, and by fertilization, mulching, or cultivation induce some strong, vigorous growth that will produce large and fair fruit. This is done in the same manner as described for the apple. Pear trees may be regrafted to desirable varieties and produce fruit more quickly than the regrafted apple tree.

Varieties.

The number of varieties of pears of commercial value is much less than that of the apple, but fewer kinds are generally planted. Those recommended and most generally grown are:

Summer.—Bartlett, Clapp, Giffard, Petite Margaret.

Autumn.—Seckel, Sheldon, Bosc, Kieffer (for canning only).

Winter.—Hovey, Lawrence, Anjou.

Harvesting the Fruit.

To be of the best quality, pears should be picked as soon as fully grown but while still hard. The right condition for picking is indicated by a slight change in color. The mellowing of the wormy specimens on the trees may indicate the time for picking. It is best, however, to pick only the large, fully matured fruit at the first picking, and allow the small specimens to grow a few days; they will often double in size in a very short time and be of much better color and quality.

Ripening the Fruit.

Pears are of much better quality picked early than if allowed to ripen on the trees. To obtain the best color and quality, they must be put into a cool, close, dark place while hard. Placing in trays or shallow drawers, one layer deep, and covering with a woollen blanket will bring on a very bright color. Most standard varieties bring a much higher price if put into cold storage for a few weeks until the main supply in the market is exhausted.

Packages for Pears.

In most Eastern local markets pears are sold in bushel boxes without covers. For shipping to distant markets they are packed in barrels, as apples are shipped. Some growers use a half-barrel cask rather large in diameter, but if a cushion is placed on the bottom and top of the bushel box hard fruit will ship as well in this package as in the barrel. In most places the grower must ship in the package demanded by the dealers.

Insects Injurious to the Pear.

There are but two insects generally seriously injurious to the pear, the San José scale and the pear psylla. The former of these pests are destroyed by spraying with the lime and sulphur mixture which the reader will find described in the bulletins of the state experiment stations. Its presence upon the trees is not noticeable except upon close examination. The leaves when attacked are small, weak, light in color, and leaves and twigs are covered with minute circular specks. These specks soon become very numerous and when they are scraped off with the back of a knife-blade slight exudations of a yellowish substance are seen. If one finds an unusual covering upon the twigs, leaves or fruit, he should send specimens at once to the local experiment station, and follow directions as to their destruction, for it takes but a year or two for them to spread over whole orchards and ruin the trees.

The pear-tree psylla is a minute brown aphid-like insect that flies about the trees in early spring and lays its eggs on the leaves and tender twigs. From the eggs comes a small flattened aphid that feeds on the juices of the tender tissues. Each one of these insects feeds in a little pool of juice that is sweetish to the taste, and wasps, flies, and hornets appear in large numbers either to feed upon the insects or upon this sweet liquid. The presence of the aphid may be known by the large number of these attendants. After the insects have worked a while the leaves, twigs and fruit are covered with dirt-like masses, where the dust of the atmosphere has adhered to the sticky exudations of the insects. This pest has not been controlled satisfactorily in the past, but it is claimed that the lime and sulphur mixture used for the San José scale will destroy these also. If

this should prove to be the case, pear growing in some sections may again become a profitable industry.

The decline in the business of fruit growing during the past few years has been due largely to the poor quality of the fruit put upon the market. We often hear of choice pears selling for from \$2 to \$4 per bushel, and choice fruit can be grown, though at an increased expense on account of insects and fungous pests. The more good fruit there is put into a market the larger will be the demand, and in the end with better prices, while poor fruit will drive the consumers to buy other kinds. It is therefore "up to" us, the growers, to produce fruit of choice quality, using economically all known means of protecting our crops from insects and disease.

Fungous Pests.

Insects are not, however, the worst obstacles of successful pear growing. Two diseases, known as "leaf blight" and "fire blight," are even more destructive. In many sections, especially where the trees are in sheltered, frosty locations, the pear trees are attacked by the leaf blight. This is a fungous or spot disease that appears upon leaves in the middle of summer, often causing them to fall. When this occurs in July or early August new shoots and often blossoms start out late in the season. This growth is weak and will not withstand the winter, making the tree more liable to the attack of fire blight the following summer. When this fungus attacks the fruit, it becomes hard and woody and cracks open. A remedy for this disease is the Bordeaux mixture, spraying just before the leaves open, just after the petals have fallen, and twice after at intervals of two or three weeks. Trees that are growing vigorously are less liable to this or any other disease than weak trees. A very rank, soft growth of wood, however, may be injured

by cold, and the next season be more liable to disease than if the growth were slower and yet vigorous.

The fire blight is a bacterial disease, closely related to small-pox and diphtheria in the human system. In extremely hot and moist weather the spores (germs) of this disease, finding their way into the tissue of the trees through the blossoms or soft new growth, grow in the cells so rapidly that in a few days large branches or even whole trees may be killed. The first appearance is a wilting of the branches and leaves; then they turn brown, and finally black. The remedy is first to cut away all diseased branches as soon as they are attacked, then produce a healthful growth by cultivation, mulching, or the use of fertilizers containing a large percentage of potash. The spraying done for the leaf blight will no doubt have a beneficial effect against this disease, as will probably the lime-sulphur mixture used for the San José scale. No outside application, however, will destroy this or any other disease of our fruits after the spores or germs have gained entrance into the tissues.

Much may be done to keep our pear and other fruit trees from being injured by insects and fungous pests by so fertilizing, cultivating, and spraying as to keep the trees in a vigorous, healthy growth. A liberal use of fertilizers containing a large percentage of potash and phosphoric acid, or simply wood ashes, lime, and a little sulphate of potash, will tend to a hard, compact, well-matured wood that will withstand blight and produce a foliage that will be resistant to leaf blight and to insects.

THE PEACH.

In many sections of the United States from Georgia to Canada the peach may be profitably grown when the soil and exposure is right. From New York City south along the coast and along the east shore of Lake Michi-

gan, where the temperature does not run much below zero and shows little variation during the winter, the peach may be grown upon almost any elevation or ex-



FIG. 57—A Three-Year-Old Peach Orchard in Summer Growth.

posure; but in the interior and at the North they must be planted on elevated land with full exposure that will cause firm, well-matured wood, and where the temperature does not run as low as in the valleys. The peach succeeds best in a rather thin soil, but

it must be made rich enough in organic matter by plowing under green crops or by other means to produce a good growth of wood. For the best results the land should be fitted by deep plowing and harrowing.

Trees and Their Preparation.

Northern-grown trees are generally selected for planting in northern sections, but if well matured it matters little whether they are grown North or South, though the nearer they are grown to the section where planted the better. Trees of medium or small size are selected, as they generally have more dormant lateral buds than those of larger size. As a rule the No. 2 trees in any lot are those of a weaker growth and will make smaller trees; therefore it would be better to buy from a lot where all have made a rather small growth and select the best of these.

Pruning for Planting.

Most large growers of the peach trim the young trees, before planting, back to a single cane "whipstock," cutting the end back to from two to three feet long, allowing the head of the tree to be formed upon this single cane. Others cut the tree down to within two or three inches of the bud and allow only one bud to grow thus near the ground, upon which lateral branches are formed at regular intervals from one to two feet from the ground. The latter method will pro-



FIG. 58—A Peach Tree Unpruned for Four Years.

duce the best tree in shape, but it will require more attention until the head is pretty well established. During the early summer, until the head is well formed, the young trees must have constant attention, pinching back or rubbing off all shoots not desired to form a perfect head. The aim should be to produce a regularly formed head with a leader in the center. Fig. 57 shows a peach orchard in Massachusetts three years old.

After Pruning.

At the end of the first season's growth we should have a conical formed tree with three or four main branches starting at from one to three feet from the ground. Before growth begins the second year the strongest of these should be cut back from one-half or two-thirds their length, to give perfect form, and cutting out here

and there small shoots that tend to make the head too close. A low, compact tree that will carry a large crop of fruit should be the aim, and during the summer such



FIG. 59—A Four-Year-Old Peach Tree Before Pruning.



FIG. 60—A Four-Year-Old Peach Tree After Pruning.

branches as tend to outgrow their neighbors must be pinched off. Fig. 58 shows a tree unpruned for four years; Fig. 59, a tree before pruning; Fig. 60 a tree pruned.

By frequent attention fruit trees of all kinds may be kept in perfect condition for many years by the use of the pocket-knife and thumb and fingers. As the trees grow old the lateral branches tend to become weak, and either die or are cut away unless the tops are heavily pruned; and in northern sections, where the fruit buds are winter-killed, as they frequently are, this non-bearing year in old orchards is taken advantage of and the tops are cut back severely, thus forcing growth into the lower branches and practically renewing the trees. The cutting of large branches should be done with a saw and never with an axe or the heavy lever shears. All wounds more than an inch in diameter should be painted with linseed-oil paint to prevent decay.

Peach trees are not long lived. Under especially favorable conditions an orchard will last from twelve to fifteen years, and individual trees sometimes reach forty to fifty years of age. At the North, three crops in five years are expected on the average, though sometimes three or four consecutive crops may be obtained, while on the other hand the buds may be destroyed by cold as many consecutive years.

The crop, too, varies much in quantity and quality, according to the season. In a bright, warm summer, or where the trees are on a warm, sunny, but high elevation, the fruit will be of much better quality than in a cold, wet season or cool, moist soil and north or east exposure.

Gathering and Marketing the Fruit.

To be of the best quality, peaches must be ripened upon the trees, becoming almost mellow before picking. The stage of ripeness at which they should be picked can only be determined by the eye. When the fruit is fully grown and the green color has been replaced by a

delicate shade of pink, white or yellow, and when the ridge along the suture seems soft and springy, it is ready to pick for the local market. For home use they may become mellow before picking, but for a distant market they must be decidedly hard but fully grown before picking.

Packages and Marketing.

In almost every large peach-growing section some distinctive package is used. Thus in the Lake Shore region of Michigan a cheap bushel basket is used; in California, Georgia, and other Southern States, a six-basket carrier is used, each basket holding about four quarts; while through Maryland, Delaware, New Jersey, Connecticut and the Northeast the fourteen to sixteen-quart basket is used. The first and last of these packages are, to say the least, inconvenient, but they are cheap; the carrier is expensive, but carries the fruit in a much superior condition to the others mentioned.

Varieties.

New varieties of peaches, as of almost every other kind of fruit, are offered every year, and much money is expended upon them, yet few of these prove of greater value than the old standard sorts and each grower should consult the markets and the varieties he and other growers have tried before planting largely of any one kind. Different varieties, too, will vary much in different seasons, as well as in different soils and exposure, yet there are those that do well under a great variety of conditions and the latter should be most largely planted unless found to fail under the local conditions under which they must be planted. Among those that have generally proved valuable may be mentioned Champion, Mountain Rose, Old Mixon, Crawford's Early, Crawford's Late, Elberta, and Fitzgerald.

Insects Injuring the Peach.

Only two insects are seriously injurious to the peach, the peach borer and the San José scale. The first is, in its fully developed stage, a small wasp-like moth with transparent wings. It lays its egg on the trunk near the ground and its young, the larvæ or borers, feed upon the inner bark and sapwood, but not penetrating deeply into the wood as does the apple borer and many of its class.

Its presence may be known by masses of gum near the ground that come out from the injured places. If the borer is present there will be fresh chips mixed with the gum. This gum is drawn away, a little of the bark cut off, and the fat white larva is easily found and destroyed. The best time to look for these borers is in May and September. Placing sheet tin or fine wire netting about the trunk of the tree is of some benefit but is more expensive and not as effectual as the knife. After the borer has been destroyed, it is well to press the soil well in place over the injured parts.

The San José scale is a less conspicuous and far more destructive pest. It is a small scale-like insect, so small that an individual scale is scarcely distinguishable by the naked eye, but it becomes so numerous that the trunks and branches appear to be covered with scale-like deposits. When this crust of scale is scraped off with the knife many bodies are crushed and a mass of yellow liquid is seen. This pest begins to hatch its young as soon as the weather has become warm and settled; a single pair and its progeny may produce millions of young in a season. See experiment station bulletins for method of destruction.

Fungous Pests.

The "peach curl" is a fungous disease that attacks the leaves of peaches and the fruit of native plums, causing the tissues to swell to large, light yellow masses and finally drop off. It does not kill the tree, and soon new leaves come out, but two or three seasons' attacks are sufficient to so weaken the trees that they become an easy prey to peach yellows and leaf spot.

The "peach yellows," a disease as to the nature of which little is known, is by far the most destructive pest. The leaves when attacked have a light green or reddish color, and the shoots are small and wiry. The fruit is small, ripens prematurely, is of most brilliant color, and often has a decidedly bitter taste. The disease is thought to be contagious, spreading from one part of an orchard to other parts, and from one orchard to another, but this apparent contagion may be explained on the theory that the soil and climatic conditions being the same, all the trees would be likely to present the same conditions of growth that might result from extreme heat or cold, or too much or too little moisture. Trees attacked by this disease seldom recover wholly, though by severe pruning back, and the liberal use of fertilizers containing a large amount of potash, they may live many years and produce much good fruit. The cost of this work and the small cost of growing young trees up to bearing size make it more profitable to cut out all trees as soon as they are badly affected and replace them with young trees. The lime and sulphur remedy used for the destruction of the San José scale has a decidedly beneficial effect upon the leaf curl and reduces the danger of injury from the yellows, though it is not a sure remedy for the latter. As with the pear, much of success in growing peaches depends upon the condition

of the soil, the cultivation given, and the amount and kind of fertilizers used. Upon fairly good soil little or no fertilizer need be used until the trees begin to bear, if the land is deeply plowed at planting and frequently cultivated, especially during dry weather. Fertilizers containing a large amount of potash and phosphoric acid will tend to produce hard, early ripened wood that will withstand cold and extreme dry or wet weather.

THE QUINCE.

With large supplies of more delicate fruit from all sections of the world, the demand for the quince has not



FIG. 61—Pear and Quince Trees and Blackberries in the Poultry Yard.

increased as it has for the other large fruits. It is a fruit that is not consumed uncooked and few families use more than a peck or half bushel for canning or making preserves, or flavoring apple or other sauces; yet, the supply is not greater than the demand, and many growers find it a paying crop.

For the best results a deep, strong, rich soil is necessary. The best quince trees to be found in our average gardens are those growing near the overflow of the sink-drain, or cesspool, where the soil is very rich, or in poultry yards (Fig. 61); and if one expects to make quince growing profitable conditions somewhat similar to the above must be provided. The fruit often sells at from fifty cents to one dollar per peck, or three to five dollars per barrel, and a single tree will sometimes yield from two to five bushels, so that the income from the crop will warrant the rather large investment required to produce good fruit.

Selection of Trees.

Strong two-year-old trees, grown from cuttings or grafts upon apple roots, should be selected. The tops and roots should be pruned before planting in the manner directed for the apple and pear. Quince roots are fine and fibrous, and much care is needed in working fine, rich soil in about them before it is pressed into place. The after-pruning and care is about the same as for the apple and pear, but generally frequent cultivation will give better results than with trees in turf.

Form of the Trees.

The quince is trained in the tree and in the bush form. The first has the advantage that cultivation can be carried on closer to the trunk, and that borers can be more easily dug from a single trunk than where several trunks are crowded together; while in the bush form, if one trunk is injured others may keep on growing and the tree continue to produce fruit, yet if the single trunk is seriously injured the whole tree is destroyed.

For those who are not skilful in the work of training trees, or who have no time for the work, the bush form

will be best, as it is the most natural and requires the least attention. Quince trees may be set about 10 x 10 feet each way, and the heads kept in a round, compact form, heading in the strong shoots that tend to outgrow the limits of this space and thinning out the old wood, allowing the young and vigorous wood full chance for development. A vigorous growth of tree must be kept up in order to produce fine, well-colored fruit. At from three to five years in good soil the quince should begin to bear and should yield fruit more or less every year. The trees are long lived under favorable conditions, but with the "no care" method mostly in practice they live but a short time.

Varieties.

There are fewer varieties of the quince than of any of our other large fruits, the Orange, Rea's and Champion being the kinds generally grown. Of these the Orange is most grown but varies much under different kinds of soil and exposure. Rea's is larger than the average Orange quince, comes into bearing earlier, and is more highly colored. The Champion is the latest of the three in ripening, and often fails to take on the brilliant color which is so desirable in this fruit.

Marketing the Quince.

For the local trade this fruit is sold by the half peck and peck, sometimes packed in neat, handled baskets. For distant shipment they are put up in barrels, half barrels, or in covered baskets similar to those in which grapes are shipped to eastern markets; but no matter what the package, when closely packed they come out badly bruised and marked and do not look attractive or keep well. For the retail trade they may be taken from the loose package and delivered unbruised and attractive, and will keep a long time.

Insects and Diseases.

The same insects that attack the apple and pear also injure the quince, and the remedies are the same. The round-headed apple-tree borer is especially fond of the quince and frequent examinations should be made for them.

Of the diseases that attack the quince, the fire blight described under the Pear (page 161) is often very destructive to the ends of the branches but seldom destroys the entire tree, as it often does with the pear. As soon as it appears all shoots attacked should be cut away and burned. The cedar-apple fungus often attacks the young fruit and the ends of the branches or stems soon after blooming, stopping growth and causing the fruit to become hard and woody. The leaf blight, a spot fungus, often causes the leaves to fall in the late summer, thus materially checking the growth of the tree and preventing the formation of well matured wood for the next year. A remedy for these two diseases, and perhaps a preventive of the fire blight, is the Bordeaux mixture, applied just before the blossom buds open and again as soon as the petals fall. If the lime and sulphur wash was applied in April for the San José scale, only the second application of the Bordeaux mixture need be made.

THE PLUM.

Three groups of plums are now grown more or less in our gardens and orchards, the European, the Japanese, and the American. The first of these has been grown the longest, is represented by the common blue plums, the Lombard, Damson, etc., and under favorable conditions is the most profitable, though most subject to injury from insects and fungous pests, and is often injured by severe cold weather. This kind of plum lives

longer than the Japanese when well cared for. Fig. 62 shows trees more than thirty years old, that bear large crops of fruit every other year, few varieties bearing every year. For success a strong, moist, but well-underdrained soil, situated where the water and cold will drain off and abate quickly, is essential. The trees should be planted where there is full exposure to the north and west, yet with a good circulation of air and sunlight about them.



FIG. 62—Plum Trees Over Thirty Years Old.

Strong, one-year-old trees budded upon the myrobalan stock or native stock should be selected. They are pruned and prepared for planting in the same manner as the apple, the top, however, being cut to a clean whip-stock from three to four feet high. Clean and frequent cultivation should be given, and a little fertilizer containing a large percentage of potash and phosphoric acid if they are not making satisfactory growth.

The planting and summer care are practically the same as for the apple and peach. The trees, however, will need more heading in to make the lower branches grow.

As the trees grow older, thinning out of the old wood will be needed to encourage young and vigorous shoots, which are necessary for the production of large and fine fruit.

In quality the fruit of the best varieties of this group is much superior to that of the Japanese or American varieties, and when well grown sells readily at good prices. Many insects and fungous diseases attack the European plums, and constant attention needs to be given them to save the fruit and the tree from serious injury.

Insects.

The tree is attacked by the peach borer, which was described under the Peach (page 167), and the plum curculio often causes all of the fruit to fall before it is ripe. This pest attacks the fruit, making a crescent-shaped cut in the skin, laying an egg in each cut. The larva works its way into the fruit and feeds until it is about three-eighths of an inch in length, causing the fruit to fall, when it enters the ground and makes a cocoon of soil, from which it emerges the next season. Two methods are employed to destroy this pest: first, by spreading a sheet under the branches and giving the branches a sudden jarring by striking with a padded mallet or hammer, when the insects will loose their hold and fall to the sheet. In the cool of the morning they are so dormant that they will remain on the sheet until brushed or shaken into a pail or put into the stove, but in the middle of the day they will often fly into the air after a few moments of feigning death. Where a large number of trees are grown the sheet is mounted upon a frame like an inverted umbrella on wheels, which can be quickly moved from tree to tree and the insects brushed into a basin in the centre of the frame.

Jarring must be kept up every day or every other day for about two weeks from the time the plums are the size of a small pea.

Another method which has proved effectual in large orchards is spraying with the Bordeaux mixture and Paris green, as described for the codling moth (page 153), just before the flowers open, after the petals have fallen, and twice after, at intervals of a week or ten days. When all orchard trees are sprayed as above, most of these insects are destroyed or driven away. When all the orchards of a neighborhood are occupied by large numbers of poultry, nearly all insects like the above are sure to be destroyed, but where only a few trees are enclosed in a yard the insects will come in from the outside.

Fungous Diseases.

The "black knot," leaf blight, and monilia or brown fruit-rot are three very troublesome pests. The black knot is a fungus that grows upon the branches, causing unsightly black excrescences or warts. It often appears in such numbers as to kill entire trees. To destroy this pest the knots should be cut off as soon as they appear, cutting off small branches affected or paring off the wart when on the trunk or main branches. Painting the wart with thick linseed-oil paint in which a little kerosene has been mixed will also help to stop its progress. On severely infested trees the whole head may be cut off, leaving only short stubs, when a new growth of shoots will come out and renew the tree. The spraying recommended for the plum curculio will reduce the number very materially, though all of the trees in a neighborhood must be sprayed, or the spores of the fungus will be carried from the unsprayed trees to those that have been sprayed.

The monilia is a fungus that attacks the fruit as it approaches maturity, causing it to rot, and when fully developed covers the decayed fruit with light gray or white dust-like spores. These spores are carried long distances by the wind, and are ready to grow wherever the proper conditions are found—*i.e.*, any of the stem fruits with moisture upon the surface. Planting the trees where they will have full exposure to sunlight and air, a loose, open head, and thinning the fruit so that no two plums will touch are preventive measures. Spraying with the Bordeaux mixture will in a measure control this disease.

The leaf blight or shot-hole fungus often attacks the plums, causing the leaves and fruit to fall in the summer, and consequently a poor growth of tree that is liable to injury during the winter.

Varieties.

While long lists of plums are given in catalogues of nurserymen, there are but few that are desirable or satisfactory. The following list includes those that generally succeed under a variety of conditions, viz.: Bradshaw, Lombard, Lincoln, Arctic, Quackenboss, Fellemburg, Reine Claude, Washington, Green Gage, Imperial Gage and Damson (a small blue plum valuable for canning).

Marketing Plums.

Plums for the local market are sold in the common quart strawberry basket, or by the half peck and peck. For shipping they are packed in small crates or in the common grape basket. It is a fruit that keeps but a short time, especially in moist weather, and should be picked when dry and put in a dry, cool place for keeping.

The Japanese Plum.

Within the past ten or fifteen years the Japanese plum has been largely planted and is a very desirable addition to our list of fruits. It is rapid in growth, comes into bearing young (from three to five years after planting), the fruit is attractive and of fair quality. It, however, is not quite hardy; the fruit buds are often killed by cold, and the trees are short lived. This is not a very serious objection, as young trees can be very quickly and cheaply grown to fruiting size and the fruit is better from young trees than from those of older growth. It is propagated by budding upon the peach and plum stocks, the former being most generally used. It succeeds best upon thin soil but should be in full exposure to sunlight and air. One-year-old trees are best for planting, and are prepared for setting in the same manner as the peach. They should be trained low, some varieties requiring frequent heading in to keep them in a close, compact form.

For insects and fungous pests the trees should be sprayed with the Bordeaux mixture in full strength before the leaves open, as this would not injure them. After the leaves have unfolded the Bordeaux must be diluted at least one-half and arsenate of lead used in place of Paris green. The same insects and fungous pests attack this species as are injurious to the European plum and the remedies are the same with the above modifications.

To obtain fruit of large size and good quality it must be thinned before it is half grown, all specimens bearing the curculio's crescent-shaped mark be picked off, and no two plums be allowed to touch each other. Varieties of this species are rapidly increasing and much improvement in quality of fruit and hardiness of tree is to

be hoped for from some of the new introductions. At the present time the varieties that will give the best results under ordinary average conditions are probably the Abundance, Burbank, and Wickson, with Climax and October Purple as promising new varieties.

American Plums.

Varieties of the American plum may be found growing wild from Canada to Texas. Some are of good size and fair quality, and much attention is being given to crossing them with the European and Japanese varieties in the hope of obtaining fruit of better quality and larger size.

Being perfectly hardy and comparatively free from insect and fungous attack, they offer great promise, and with the size and quality of the Japanese and European varieties would be more valuable than either of the latter.

The better varieties now known have some market value, particularly where the above species are not grown, being especially valuable for preserving, many considering them equal to the Damson for this purpose; and when fully ripe they are palatable uncooked. The trees grow best in a rather moist soil, but will do well in almost any garden soil. Among the best varieties for cultivation are the Wild Goose, Weaver, Hawkeye, Wayland, Moreman, and Reed.

The only insect seriously injurious to this group of plums is the peach borer (for description and remedy see page 167). The only fungous pest of any importance is the leaf curl, which sometimes attacks the fruit as well as the leaves, causing it to puff up and soon drop off. This pest is controlled by the diluted Bordeaux mixture (4 copper sulphate, 6 lime and 100 gallons of water), and by the lime and sulphur wash when applied for the San José scale.

The Apricot.

The Apricot tree grows vigorously and often of large size from Canada to Texas, but is very short lived, often dying in the midst of the full summer's growth or being frequently killed by severe winter weather. The fruit buds are rather more tender than those of the peach and no varieties of equal quality to the peach will grow at the North. Varieties of the European, Russian and Jap-



FIG. 63—Currant Bushes Under Plum and Apricot Trees.

anese apricots resemble each other very closely but none of them have much commercial value. The trees are budded upon the peach and seedling apricot stocks, and require about the same treatment as the plum in the preparation of the tree for planting and after care. The insect and fungous pests are the same as those attacking the plum, and require the same treatment. Among the leading European varieties are the Early Montgamet and Moore Park. Fig. 63 shows apricot and plum trees with currant bushes growing between them.

The fruit is marketed in the same manner as the plum, most of it, however, being used for canning, as very few kinds mature so as to be equal to the plum or peach in quality. Numerous hybrids between the above three species have been produced, some of which are of much promise, and if more hardiness of tree and better quality of fruit could be produced would be a great acquisition.

The Nectarine.

This fruit may be called a smooth-skinned peach, for the tree can hardly be distinguished from the peach tree, but there is no down or woolly covering on the skin of the fruit as on the peach. The tree is as hardy as the peach tree, but the fruit buds are more frequently winter-killed. The nectarine requires the same treatment as the peach in every way, but as the skin of the fruit is smooth more attention must be given to protection from the plum curculio.

The Downton and Boston are among the best varieties.

THE CHERRY.

This is our most difficult fruit to grow in nearly all sections of the country with the exception, perhaps, of California and the Pacific Coast.

As with all of the stone fruits, more or less, the trees are easily injured by severe cold, growing well for a few years while young and then dying. The only places where we find trees of large size are in grass along the roadsides or on the lawns, and even here old trees often die without apparent cause in a single winter.

The best land for cherries is a rather thin, poor soil, with quick drainage; but it must be made rich enough to produce a good growth, if not already in that condition, by the application of stable manure in the fall before the ground freezes.

Little or no pruning is needed except to head in those branches that grow so as to give the trees an irregular shape. One- or two-year-old trees are best for planting, the pruning needed before planting being the same as for the apple and pear. The spring is the best time for planting, though if planted early in the fall they will succeed fairly well.

Varieties.

Two groups of cherries are grown, the sour or cooking cherries and the sweet for table use.

The former are more hardy and productive, and most easily grown. Of the sour cherries, the Early Richmond and Montmorency are generally grown, while of the sweet kinds the Governor Wood, Black Tartarian, and Windsor are perhaps the best.

Marketing the Fruit.

Most of the fruit grown in the Eastern States is marketed in quart strawberry baskets packed in 32-quart or bushel crates, though where grown for canning they are sold in larger market baskets.

Insect and Fungous Pests.

The insects most destructive to the cherry are the black aphid or plant louse, the plum curculio, and the peach borer. The former is black in color and causes the leaves to curl up and often drop off after a time. The remedy is to pick off and destroy the curled leaves when they first appear. The remedy for the other two insect pests has been described under the Plum and Peach. The black knot is destroyed as described under the Plum.

CHAPTER IX

THE GRAPE

MANY species of the grape grow wild from Canada to Texas, and it is more or less cultivated in garden and vineyard throughout this territory. As a home fruit, trained upon the garden trellis or upon walls and the sides of buildings, there are few homes where the grape may not be grown with more or less success; but for commercial purposes, it is only extensively cultivated in sections especially adapted to its growth. In the New England States we find only here and there vineyards of small extent, but as we go west the Hudson River and Lake Shore vineyards assume large proportions, those of New York, Ohio, Michigan, etc., being the largest grape-growing regions in the world. The grape is grown to a limited extent in the Middle and Southern States, and to a larger extent on the Pacific coast, where, owing to there being no rain during the ripening season, the fruit can be grown upon self-supporting short trunks. At the East varieties or hybrids of the Fox, Pigeon and Summer grapes are most grown, while South and on the Pacific coast the European variety and its hybrids, with many American species, are more largely grown.

The conditions most favorable for the grape are a rather light soil, well underdrained, in full exposure to sunlight and air, and on the south slope of high hills, especially at the North, safe from late frosts in the spring and early frosts in the fall; or on the borders of large sheets of water, where frosts are prevented by

the warm air arising from the water. On the hilltops of New England, and similarly on the lake shores of New York, Ohio and Michigan, frosts do not generally do harm until after the first of October, at which time the crop is usually ripe enough to pick.

Propagation of the Grape.

The grape vine is readily propagated by the amateur, by cutting; by layers, and to some extent by grafting.



FIG. 64—A Small Vineyard.

Cuttings are short pieces of canes of the last season's growth, six to eight inches long, cut with a sharp knife square across the base at a bud, and at the end from one-half to an inch from the bud. The best time for making grape cuttings is in the fall soon after the leaves have fallen and up to the time the ground freezes, but they may be made in the winter when the canes are not frozen. They may be planted in the fall as soon as made, or tied in bundles of twenty-five and heeled in

with moist soil closely packed against all parts. They may also be kept in moist sawdust upon ice. They are planted in rows any desired distance apart, the cuttings being about two inches apart in the row, the soil pressed very closely about the base, and the end bud a half inch below the surface.

Layering is a very satisfactory method of increasing the vine. The spring layer consists in first digging a trench about six inches deep close up under the vines, where lateral canes can be bent into it. In this trench are placed canes of last season's growth, held in place by stones or forked sticks. When the buds along this cane have grown from four to six inches long, rich soil is packed firmly about them, when roots will start, and at the end of the season we will have as many well-rooted vines as there are shoots that grew on the cane laid down. Summer layers are made about July 1st, by laying down canes of the present season's growth and covering with moist rich soil; at the end of the season we will have as many rooted vines as were canes laid down. Layered vines may be dug in the fall and planted, or left until spring, as may be most convenient.

In the vineyard, vines are grown from six by eight to eight by ten feet apart, according to the variety and method of training. The best vines for vineyard growth are strong one-year-old No. 1. These should have but one cane, cut back to two or three buds, and the roots shortened to about six inches. In planting, the roots are spread out over a cone or ridge of soil, or on the side of a trench, the base of the cane being covered with only two or three inches of soil, but the roots running full depth into the soil. Press the soil firmly about the roots and place a stake at each one on the north side. The first year any hoed crops like beans, peas, potatoes, beets, carrots, etc., may be grown on the land, taking



FIG. 65—STABLE ORNAMENTED BY A GRAPEVINE FIFTY YEARS OLD.

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care that the one cane allowed to grow be not injured, but corn and small grains should not be grown among them. Only one cane should be allowed to grow, and this should be kept tied to the stake, all laterals being rubbed off as soon as started. At the end of the first year and the beginning of the second, this cane, if it has made growth enough, is cut off at about two and one-half feet from the ground or on the level with the first wire or other support of the trellis. If to be trained



FIG. 66—Single Grapevine Pruned and Fruiting; Cane Tied to Top Wire.

to the sides of a building, this cane is encouraged to grow at the end by pinching back the laterals until it is carried to the desired height. In this way single vines may be made to extend over long arbors and verandas, or over the sides of large buildings, serving as an ornamental covering and at the same time producing large crops of fruit. (Fig. 65.)

In the vineyard the vines are trained to trellises made of wire and posts, one, two or three wires being used, according to the method of training. In the very simple method shown in the picture (Fig. 66) the canes bearing the fruit are trained upon the upper

wire, while the new cane that is to bear fruit the next season is trained to the lower wire. Chestnut, cedar, or catalpa posts are the most durable, and No. 12 or No. 14 galvanized wire is used. The posts are about eight feet long, set three feet into the ground. The top wire is about five feet from the ground, the second one being placed about eighteen inches below it. The fruit is borne upon the top wire (Fig. 67) while one or more new canes are grown upon the lower wire, with which to replace



FIG. 67—A Single Vine with Fruit on the Top Wire.

that above after the fruit is gathered. During the summer growth of all canes but the new ones is to be checked by pinching, thus forcing all growth into the fruit and the new canes that are to bear fruit next year. The ends of the laterals on the upper canes that bear the fruit must be pinched off as soon as the last cluster of fruit buds appear, which is often the last of May or early June, and whenever new buds start on these laterals all but one leaf should be pinched off. There are many other systems of pruning and training practiced by grape growers, but the above recommends itself as simple, requiring but little work; besides, the

fruit carried high upon the vine, is less liable to rot or mildew, and is where it can be readily thinned and picked.

Pruning the Vine.

By the above method all the pruning required is the cutting off of the fruiting cane after the leaves have fallen, removing all laterals and small canes near the



FIG. 68—Grapevine in Garden Unpruned for Five Years.

ground, and heading back the new canes to the proper length to cover the trellis, or other support. Either one or two canes may be used on the trellis; if two, one is trained each side of the centre of the vine.

The time for pruning the vines may be from the falling of the leaves in the fall to the starting of the buds in the spring, but the earlier it is done the better. If left until growth begins, the sap will often flow from the cut and possibly injure the vines.

Neglected vines may be pruned somewhat after the

above system, as shown in the accompanying picture (Fig. 68). Beginning at one end of the trellis new canes are selected from near the centre of the vine, in sufficient numbers to cover the wires or rails, and all others are cut away until the vine appears as shown in Fig. 69. The vine in full foliage is shown in Fig. 70.

Vines upon buildings are treated in a similar manner.



FIG. 69—Grapevine in Garden After Pruning.

One new cane only covers the space occupied by the mass of unformed canes often found upon such vines.

Cultivation and Fertilization.

There is no fruit that so well repays good care and an abundance of plant food as the grape, but there is more danger of over-feeding than with any other fruit crop. The vineyard should be kept cultivated enough to keep down all weeds, and in times of drouth often enough to keep a dust mulch upon the surface to retain what

moisture there may be in the soil. With the plow, the spring-tooth cultivator, and the grape horse-hoe, little or no hand labor need be done in cultivation. The grape horse-hoe enables one to draw the soil away from the vine or throw it up against it, leaving only a little space around each vine that must be hand-hoed, and is a great labor saver.



FIG. 70—Grapevine in Garden in September, in Full Foliage and Fruit.

Little or no nitrogenous fertilizers should be applied unless the soil is very poor. A very good fertilizer is made of equal parts of fine ground bone and sulphate of potash, using from 500 to 1000 pounds of this mixture per acre, according to the growth of vine and crop of fruit. For vines in the garden, if there is a wash of plant food from surroundings, or if fertilizers are applied to crops near by, no fertilizers need be used upon the vines. Poultry droppings and wood ashes make a good fertilizer for the grape, but if the vines are growing vigorously only the wood ashes should be used.

Varieties.

Among the many varieties grown there are but few of much commercial importance—none, in fact, that are entirely hardy and free from disease under all conditions. There are, however, several that are largely grown. For New England the Worden, Concord, and Green Mountain are the most hardy. The Delaware, Brighton, and Campbell's Early will be of some value under favorable conditions. The Delaware is subject to mildew, and the Brighton does not fruit well unless near vines of other varieties the pollen from which will fertilize their flowers, which are not wholly self-fertile. To the above may be added for New York, Ohio, and the Middle West the Catawba, Diamond, Niagara, Wilder, etc., all of which, however, are more subject to mildew and rot than those first mentioned. There is always a great temptation to try new varieties, and these young vines often show great promise when planted under favorable conditions and in new soil, but when the vines are older and the soil becomes somewhat exhausted they develop many undesirable qualities. Therefore it is best to plant largely only varieties of known hardiness and market value, and which are profitable in one's own locality.

Marketing the Fruit.

In large grape-growing sections, the fruit is packed for table use in small baskets of three sizes with handles, weighing, basket and all, three, five, and ten pounds. In this package they may be shipped a long distance and delivered to the consumer in the original package. Fruit from California is shipped in square baskets, four or six in a carrier, and in this way stands shipment a long distance. Where the fruit is largely grown it is generally bought on the vines by packers, the purchaser picking

and packing the fruit. Within a few years the manufacture of grape juice has greatly increased, and a large share of the crop in some sections goes to the factory, where it is sold in bulk at from \$25 to \$35 per ton. Grapes for packing sell for from one cent to two cents per pound according to quality. The yield per acre under the best conditions is from two to three tons.

In New England and near local markets grapes are put into shallow trays of 16 x 24 inches, and three inches deep. The grapes are packed, beginning at one side, in two layers in such a manner that no stems show and the grapes with the bloom untouched present a very attractive appearance, and sell at a high price. Some growers in Massachusetts and Connecticut pack ten to twelve pounds in two layers in the ordinary diamond market basket and sell them to hotels and fancy restaurants at a better price than they would bring packed in closed baskets.

Girdling the Grape Vine.

In northern sections where frosts come early it is necessary to hasten the ripening of the crop or it may be cut off before it is ripe. This is done by girdling or ringing the vine—*i.e.*, taking out a ring of bark from one-half to one inch wide just back of the fruit, which stops the backward flow of the elaborated sap to the stem and root back of the girdle, and it goes to the perfection of the leaves and fruit, causing the latter to ripen a week or ten days earlier than fruit on ungirdled canes. By this practice the northern grower can put his grapes into the local market as early or earlier than his neighbors of the Hudson River or Lake Shore vineyards. It will also be fresher and more attractive, and usually commands higher prices. The quality of the fruit is somewhat improved by girdling, it being more juicy if

not sweeter. It contains more sugar than the fruit from ungirdled vines, but this is not apparent to the taste, as the acid is more soluble than the sugar. The part of the vine girdled must be cut entirely away before the next year, as it would make a very slow growth, if any, and we must therefore grow sufficient new vine back of the girdled part to supply canes for the next season's growth.

Insects and Fungous Pests.

There are many insects which attack the grape, the most troublesome, perhaps, being the "rose bug." This pest comes out of the ground about the time the vine blossoms and feeds upon the blossom clusters. It works in pairs, a single one of which will often destroy several clusters of blossoms in a few hours. In large vineyards they only work on the borders, as they come in from the grass-fields adjoining, while the centres are uninjured. The only remedy for this pest is to take a shallow pail or pan, and put in a little water with about a half inch of kerosene oil on top. Hold this under the cluster of insects, touch them, and they fall into the oil, from which they never escape. As these insects are coming from the ground from day to day for about two weeks, picking must be done two or three times at intervals of two days or until the petals have fallen from the grape flowers, after which the pests do not seem to care for them and no further picking is needed. Closer attention need be given to vines in the garden, as the insects come from all sides and where there are but a few vines a covering of mosquito netting would be the most effective and satisfactory.

The grape-leaf hopper is a troublesome pest. It is much like the leaf hopper that attacks rose leaves in the early summer, causing them to look white and, if the attack is long continued, to turn brown and drop off,



FIG. 71—SPRAYED AND UNSPRAYED VINES: FIRST AND THIRD VINES SPRAYED; SECOND AND FOURTH UNSPRAYED.

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the fruit remaining unripe upon the vines until destroyed by frost. No entirely satisfactory remedy for this pest has been found, though spraying with kerosene emulsion with all the force possible as soon as the pest appears will check their depredations. Clean cultivation also helps the vines to overcome their injury.

Fungous Pests.

Diseases of several kinds are more destructive to the grape than insects. The downy and powdery mildew is very abundant on the leaves and fruit in moist hot weather, causing the leaves to fall off and the fruit to remain unripe. Fig. 71 shows vines sprayed and unsprayed. Varieties like the Delaware, Brighton, Niagara, etc., are much subject to these attacks. The black rot is a fungus which attacks the fruit, causing it to turn brown and often destroying the entire crop. If the rot appears when the berries are small they dry up and are black in color, but if it does not appear until the fruit is nearly ripe they fall off before turning black. This pest and the mildews are kept in check by spraying with the Bordeaux mixture, applying it just before the blossom buds open, repeating it two or three times at intervals of a week or ten days. If Paris green at the rate of one-fourth pound to fifty gallons of the mixture is used, it will kill some of the leaf-eating insects that attack the vine, possibly some of the rose bugs.

Were it not for the insects and fungus pests, and the damage by frosts, grape growing on the high hills of New England would become a most profitable industry, as by the process of girdling above described the time of ripening can be hastened so as to successfully compete with the large crops of the West.

CHAPTER X

THE BUSH FRUITS

THE raspberry, the blackberry and the currant are almost a necessity in the home garden, and when properly cared for are profitable field crops. The raspberry and blackberry require somewhat the same conditions and treatment. They will grow upon almost any good garden soil if it is well under-drained, but to produce large fruit there must be an abundance of moisture in the soil at the time of ripening. This is obtained upon a thin soil by plowing in heavy dressings of stable manure or green crops, by mulching, by frequent stirring of the soil, or by irrigation. These are propagated by suckers from the roots—*i.e.*, shoots coming from buds on the roots—and by root cuttings. The latter are much the best to plant, as they have much larger and finer roots. Root cuttings are made by digging up in the fall a lot of the roots of the kind desired and cutting them into lengths of about two inches. These are planted before the ground freezes, in trenches about five inches wide and two or three inches apart, about as thick as peas would be planted, and covered with two inches of rich soil. Before the ground freezes the trench should be covered with four to six inches of strawy horse manure or straw. In the spring, after the hard freezing is over, the coarse cover is carefully raked off and the surface raked smooth. During the summer one or more shoots will grow from each piece of root, which by the end of the season will be a foot or more high and will make the best

plants for fall planting. If one is not ready to plant the roots in the fall, they may be packed in moist soil out of doors or in a cold cellar until early spring, when they must be planted at the earliest possible time. But they are not as certain to grow as when planted in the fall.

Black-caps, purple-caps, and dewberries are propagated by the rooting of the tips of the canes. These will root by simply lying on the ground for a little time, but the rooting will be hastened by covering with a little soil. Raspberries are planted in hills three by four, or in rows five feet apart, and blackberry plants in hills four by five or in rows five or six feet apart. In the garden the hills and rows may be closer than in the field, where the horse is used in cultivating. All suckers that are not needed to make up full rows or hills are treated as weeds. Neither of these crops should be planted in the fence corners or near the boundary line, as suckers will be sure to spread over the line. Frequent cultivation must be given to keep down the weeds.

Black-cap and purple-cap raspberries are grown in some sections for market, while in others there is demand only for home use. The black-cap is hardy and productive, but owing to onslaughts of insects and fungous pests a plantation must be more frequently renewed than the red varieties. The purple-caps are not quite hardy and the color of the fruit makes it unsalable, yet in quality it is superior to the red or black-caps.

Pruning raspberries and blackberries is a simple process. The fruiting canes should be cut out as soon as the fruit has been gathered, and all surplus and weak canes are taken out at the same time. Some growers cut or pinch back the new growth to from two to three feet high to make them grow stocky and be self-supporting, while others let the canes grow full length and support them by wires or other kinds of trellis. The work

of pruning may be done at any time after the leaves have fallen, but is generally left until growth begins so that the dead wood may then be distinguished and cut away and the live wood preserved. Many varieties are weak in growth and require some support. When

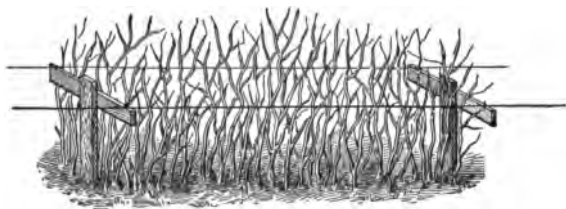


FIG. 72—Trellis With Cross Supports for Raspberry and Blackberry Canes.

planted in hills a stake may be driven in each hill; when in rows, a wire stretched on both sides (Fig. 72) will give all the support needed. The wires are first stretched loosely from crosspieces twelve to fifteen inches long nailed on stakes planted at intervals of ten to fifteen feet. The canes are then drawn inside and

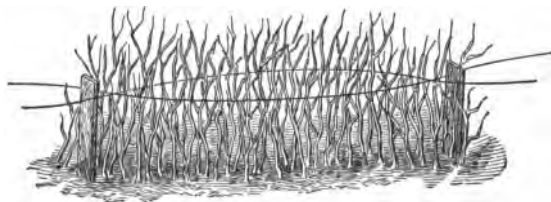


FIG. 73—Trellis Without Cross Supports.

the wires drawn up taut and caught upon a nail, thus holding them in an upright position. When the canes are not very thick and the rows close together no cross-piece need be used, the wires being simply crossed over the stake (Fig. 73). These wires may be loosened at any time, thrown over into the middle of the row, and

again brought up against any canes that may have grown outside the wire. This support is a great help in picking the fruit, which can be done more comfortably. No. 14 galvanized wire is large enough for this purpose, and if of good quality, well galvanized, will last from ten to twenty years. Posts or stakes for this support will last but six to eight years. Chestnut, cedar, locust and catalpa make durable stakes.

Under favorable conditions raspberry and blackberry plantations will continue profitable for a great many years, but as a rule the greatest profit will be obtained if a new plantation is made every six or eight years.

Insects and Diseases.

Neither the red raspberry or blackberry is often seriously injured by insects, but the black-cap is often nearly destroyed by the "cane-girdler." This insect cuts a ring around the new canes soon after they start from the ground and lays an egg below the cut. When this egg hatches the cane breaks off and the young larva has a large supply of food from the girdled place. It continues to feed downward, often going into the roots and thus destroying the entire plant. The remedy is to cut off the end of the girdled cane half an inch to an inch below the girdling as soon as it begins to wilt, and burn it.

A leaf blight attacks the raspberries in wet, hot weather, especially when the plants are not growing vigorously, often causing all but two or three of the leaves on the ends of the canes to fall before ripening. The "spring" orange rust often attacks the leaves of some varieties of the blackberry, developing large masses of beautiful orange spores in the early summer. This generally kills the canes attacked and when discovered the infested stalks should be cut out at once

and burned. The "fall or summer" orange rust attacks the under sides of the leaves of some varieties in mid-season, causing them to fall and the consequent drying up of the fruit. The above fungous pests are kept in check and prevented from doing serious harm by spraying with the Bordeaux mixture before the leaves unfold, again just before the flowers open, and again as soon as the fruit is picked. If sprayed when the fruit is half grown the mixture adheres so as to render it unsalable.

The dewberry or running blackberry is successfully grown in some sections. The plants are set in rows three and one-half to four feet apart, the canes lying on the ground during the summer.

The horse cultivator is run the same way every time, so that the canes may not be torn by the teeth catching in them. At the North, where the canes are liable to be winter killed, a light covering of hay, straw, or pine boughs is placed over them. For summer growth and fruiting the canes are tied up to keep the fruit from the ground. This species, being nearly two weeks earlier in ripening than the "high bush" blackberry, brings a higher price and has been made very profitable.

Varieties.

The following are the varieties most generally grown: Red raspberries—Cuthbert, Miller; black-cap raspberries—Cumberland, Ohio, Hilborn; purple-cap raspberries—Columbian, Shaffer; blackberries (high)—Agawam, Snyder, Eldorado; dewberries—Lucretia.

THE CURRANT.

This is distinctly a home fruit, being found more or less in every garden, but in many places it is grown extensively for market. It is a very healthful fruit, its

rich, clear acid making it especially palatable during hot weather. It is easily grown but is often planted away in a neglected corner of the garden, in which case the fruit is likely to be small and of poor quality. It is propagated in the same manner as the grape, shoots of the last season's growth being cut up into lengths of six to eight inches as soon in the fall as the leaves fall. When planted early roots often form before winter sets in and the plants make a large growth the following spring. The cutting bed must be covered with hay or coarse manure to keep them from being heaved out by the frost. A rich, moist, but well-underdrained soil is necessary for success with this fruit, the plants being set three by five or four by six according to the variety and the method of pruning. Success in growing large fruit depends upon the richness of the soil and the method of pruning. The largest and best fruit is borne upon canes two and three years old, therefore we cut out all wood older than this and thin out the small wood so as to have only a limited amount of the strongest canes. By this method of pruning a large yield of fruit is produced and it is so large and fine that it sells for the highest prices. Thorough cultivation must be given, and an annual dressing of stable manure or fruit-tree fertilizer. The third year from planting, young currant bushes should produce a paying crop of fruit, and from this time on should yield annual crops as long as they are well cared for. In some soils the bushes are heaved out by frosts, and in the fall, just before the ground freezes up, the soil should be plowed up against them or a heavy covering of stable manure be put about them. The currant may be grown under the shade of trees better than any other fruit. (Fig. 63.)

Varieties.

Only a few varieties of currants are grown, there being less difference in them than in the varieties of other fruit, the size, productiveness, and quality being largely dependent upon the richness of the soil, the cultivation given, and the pruning. Of the red varieties, the Fay, Cherry, Wilder and Red Cross are the largest and most productive. Of the white varieties, the White Grape and White Imperial are among the best, the last named being of especially fine quality.

Black or English currants are sometimes grown for home use, and near factory villages of English people there is some demand for them. The bushes are hardy, very productive, and free from all insect and fungous attack. The fruit of the yellow-flowered currant is of some value, especially the variety known as Crandall's Improved, but it ripens unequally upon the bushes so that the crop cannot all be picked at one time. In quality this fruit is superior to that of the black or English currant.

Insect and Fungous Pests.

The worst enemy of the currant bushes is the currant worm, known wherever there are currant bushes. The mature insect lays its eggs on the mid-rib of the leaves. The worms soon hatch out, and first each one makes a minute hole in the leaf upon which the egg was laid. They feed very vigorously and in ten days or two weeks the leaves will have been entirely eaten up. The worm is destroyed by hellebore used with the Bordeaux mixture.

A cane-girdler similar to the one attacking the black-cap raspberry lays its eggs near the ends of the new-growing cane in June; the end of this cane wilts and

breaks off, when the larva works down into the cane, often destroying from one to two feet in length. This pest is destroyed by cutting off the cane a little below the injury as soon as the wilting is discovered. A leaf-blight fungus often comes upon the leaves of the currant before the fruit is ripe, causing them to fall and leave the bushes bare for the rest of the season, thus weakening them so that the growth the next year is very poor, and in some cases killing the bushes in a few years. This may be prevented by the use of the Bordeaux mixture applied before the buds open, as soon as the fruit has set, and again as soon as the fruit has been gathered. This spraying and that for the currant worm is done by adding one-fourth pound of hellebore to fifty gallons of the Bordeaux.

THE GOOSEBERRY.

This is a desirable fruit for making jams and preserves, and is easily grown, but there is little demand for it in any but the very large markets. It requires the same kind of soil as the currant and the same treatment as to cultivation, pruning, and insect and fungous pests. Gooseberry bushes are most easily propagated by laying the lower branches, stooling—*i.e.*, cutting the bushes close to the ground and allowing numerous shoots to grow out at the stumps, and mounding up moist soil about them, when roots will form upon the base of each shoot. The principal difficulty in growing the gooseberry, especially the English varieties, is a mildew that attacks the fruit and leaves. This is remedied in part by the Bordeaux mixture. Most of the American seedlings are comparatively free from this disease.

The fruit of the currant and gooseberry is sold in quart strawberry baskets packed in the 32-quart crate, the currants selling for from eight to fifteen cents per

quart. The gooseberry is marketed both in the green and ripe state, and sells at about the same price as the currant.

Varieties.

Among the varieties of the gooseberry to be recommended are: English—Industry, Triumph, and Whitesmith; American—Downing, Pearl, and Red Jacket.

THE STRAWBERRY.

In many particulars this fruit is of more importance than the apple or the grape. It can be grown on smaller areas, takes the shortest time to produce, and comes earlier in the season. It is a healthful fruit, and will yield more to the acre than any other, large or small, having yielded, on small plots, at the rate of over 20,000 quarts per acre, and a single acre has produced more than 15,000 quarts.

The Soil.

The strawberry succeeds best in a deep, sandy loam soil, well supplied with organic matter from stable or clover sod or other material turned under the previous season. Upon land in an ordinarily good condition ten to fifteen cords of stable manure may be used, or a good crop may be grown in such land with commercial fertilizers rich in potash and phosphoric acid, from 1500 to 2000 pounds per acre. This had best be put on at three intervals—*i.e.*, 500 pounds spread on the rows at setting the plants, 500 more in early July, and the balance the last of August or early September.

Setting the Plants.

Plants for setting should be young runners with an abundance of white roots. These are taken from the edges of fruiting beds or from beds grown for this purpose, the latter generally being stronger. The spring

is the best time for planting, as the plants are dormant, the weather is generally moist and cool, and roots are formed more quickly than later. They may, however, be set at any time from April to September with some degree of success.

Methods of Planting.

Three methods of planting are practised, the hill, the hedge-row, and the matted-row systems. In the hill



FIG. 74—Strawberry Plants in Hills.

system (Fig. 74) as many plants as it is desired to fruit are planted and all runners are kept cut off as fast as they start until at the end of the season we have large plants (stools), with a great many crown buds which under favorable conditions will produce a large number of berries per plant. The plants are generally set in rows two and one-half to three feet apart and eighteen inches in the row. By this method the labor of keeping the runners cut off is great, but as no runners interfere the

hoe can be run in about the plants and the bed kept free from weeds as cheaply as if the plants were allowed to make runners. By the hedge row (Fig. 75) plants are set in rows about three feet apart and from two to three feet in the row, and runners enough are allowed to grow to fill out a bed of three feet with plants one foot apart. With plants set early in the spring these runners will make growth nearly as large as the hill plants but it takes more work to keep the weeds from among them



FIG. 75—Strawberry Field. The Double Hedge-Row System.

than under the hill system. The matted-row system is where plants are set at various distances, according to soil, three by three, four by four, and four by five feet apart, and all the runners allowed to grow, covering beds two to three feet in width. When the plants are set the greater distance, and the runners are allowed to root not nearer than four or five inches apart, the crop of fruit will be large and of fine quality, but when all the runners grow over a narrow space, the plants will be weak, the fruit small and in wet weather of poor color and quality, and will decay quickly.

With all of these systems it is best to keep all of the runners cut off from the old plants until they have gained considerable strength, generally up to the first of July, before the permanent runners are allowed to root. It takes more work to keep the weeds out of a matted row than from the hills or hedge rows, as most of them must be pulled by hand, the hoe starting the half-rooted plants as it is run in among them.

Thorough and frequent cultivation must be given from the time the plants are set until the ground freezes in the fall, as many weeds like grasses and chickweed grow at any time when the ground is not frozen. One of the great advantages of the hill system is that this work can be done with the horse the wide way of the plants, and the narrow way with the hand wheel-hoe. In the spring we have grasses, pigweed, shepherd's purse, chickweed, etc., to contend with; in the summer, "pusley," barnyard grass, etc., and in the fall, shepherd's purse, sorrel, chickweed, etc., and the time to kill them is when the little seedlings are bursting through the ground. From April to July the work, except pulling off the runners, may be entirely done by the horse with the cultivator and weeder. The latter tool covers six feet of surface at once, and where the soil is free from sticks, grass, or weeds, the plants will not be injured by it.

Winter Protection.

The strawberry plant is perfectly hardy to the far north, but is easily injured during the winter by freezing and thawing weather, especially in moist soils, and must be covered for protection from this danger. Coarse strawy manure, old hay or straw, pine needles, pine boughs, etc., may be used for this purpose. Care should be taken that the covering material does not contain weed seeds. Most growers put this covering on after

the ground has been frozen hard enough to hold up the horse and load, but as in many cases there is a long-continued spell of freezing and thawing weather before this condition is reached, it is best to put on a light covering as soon as severe freezing occurs and then in the North add more covering as the weather becomes colder. The mulch is generally spread over the entire surface, but when the rows are wide apart only the bed of plants need be covered. In the spring some growers remove the mulch from the beds and cultivate the soil until the fruit begins to form and then return it, but most of them let it lie upon the beds, simply drawing it away from the crowns of the plants so that they may work out without injury. On light land subject to drouth the former practice will give the best results, while in heavy soils the moisture dries out more rapidly if the mulch is not removed. Quickly soluble fertilizers are sometimes applied in the spring, but if used in large quantities they tend to produce a leaf growth at the expense of the fruit. A dressing of acid phosphate and sulphate of potash put on very early in the spring, or just as the fruit is beginning to form, will often greatly increase the yield, but as a rule it is best to use the plant food in the summer and fall. Nitrogenous fertilizers should not be used in the spring when the fruit is beginning to form.

Harvesting the Fruit.

One of the great trials of the strawberry grower is getting his fruit picked, packed, and marketed. The fruit ripens rapidly and must be picked every day or every other day, and unfavorable weather often prevents it being harvested in good condition. It is often difficult, too, to find help to pick and properly pack the fruit. Women and children are generally employed for



FIG. 76—THE STRAWBERRY HARVEST.

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this work and are paid by the box, though when fancy berries are produced that require especial care in picking, etc., men are sometimes employed (Fig. 76). It is a very trying job to keep a lot of young strawberry pickers in order so that they will at all times do good work. To get the best results one attendant or overseer is required in the field to look after twelve to fifteen pickers and another to carry in the berries and keep records. To pack the fruit for this number of pickers one person is needed when the berries are only topped out and two when all are sorted. Many growers make two sorts, No. 1 berries being sold with the grower's stamp, while the No. 2 grade is sold without the stamp. As soon as the berries are picked they should be put in a cool, dry shed or cellar, but not upon ice unless they are to be kept a long time. If wet when picked they should be placed in a cool draft if possible to dry them off before packing in the crates. The most common package is the 32-quart crate. This is a gift package costing from ten to fifteen cents each. Southern growers who ship their fruit to the North must buy new crates for each crop, as the old ones are not returned to them, but those at the North secure these crates early in the season at almost a nominal cost or as a gift package, exchanging each full crate for an empty one.

Varieties.

The varieties of the strawberry in cultivation may be divided into two groups—the staminate or perfect flowered kinds that have both stamens and pistils, and those that have pistils only and will produce no fruit unless staminate flowered varieties are planted beside them. These two kinds are arranged in many ways, but the best results will be obtained if a bed of three or four rows of one kind is planted and then the same

of the other. Pistillate varieties are generally more productive than those having stamens and pistils.

Many new varieties are introduced each year with high recommendations, but very few of them prove of much value; yet as old varieties soon deteriorate, it becomes necessary to plant new kinds after a few years. There is now scarcely a variety in cultivation that was grown ten to fifteen years ago.

There is great fascination in testing new varieties, yet when we consider that not one in a hundred of the new varieties equals the old standard sorts, we should go slow in planting largely any new kind. The trial of a dozen or two plants of a kind under two or three different conditions will enable one to determine whether or not it is wise to plant it largely.

Of the varieties now generally grown the following are the best: Staminate or perfect—Clyde, Brandywine, Senator Dunlap, Corsican; pistillate or imperfect—Sample, Haverland, Bubach.

Insect and Fungous Pests.

The strawberry is subject to these pests but not to the extent that some other fruits are, and they are more easily kept under control than many others.

The most destructive insect is the larva of the June-bug or May-beetle. This insect lays its eggs in land where there is an abundance of grass or other fine roots for its larvæ to feed upon, and if we turn such soil over and set strawberry plants in it, the grass roots being gone these larvæ feed upon the strawberry roots. To avoid this pest, therefore, we cultivate the land for one or two years with some other hoed crop like corn, potatoes, etc. The black paria and strawberry-crown borer are minute beetles that lay their eggs close up to the crown of the strawberry plants; the larvæ feed upon the roots,

and later, in the beetle form, upon the leaves, often doing much harm. The remedy for these two little pests is to grow only one crop on the land each year, planting a bed each spring, harvesting the crop the following year, and plowing under the tops, mulch and all, while the larvæ are feeding upon the roots. Spraying with Paris green and the Bordeaux mixture may kill many of them, but this is hardly needed as plowing the immature larvæ will destroy most of them.

The strawberry blight is the only serious fungous pest met with. This comes upon the plants at any time from planting to the ripening of the fruit when the weather is moist and warm and the plants are not in a vigorous and active condition. It appears as small reddish-brown spots upon the leaves and when numerous causes them to dry up. The remedy is to begin with the young plants before they are set by dipping them in the Bordeaux mixture, and spraying once or twice after during the summer. Then the following spring spray as soon as the mulch is drawn off, and again before the blossoms open.

The strawberry crop is especially the crop for the beginner, or one starting in business upon a new place, because in twelve to fifteen months from planting a crop may be expected, and from a few plants we may in a year or two grow enough to plant acres, and at the same time produce fruit for market.

CHAPTER XI

MARKET GARDENING

THE home garden has been discussed in Chapter VI, and this chapter we shall devote to market gardening, or commercial gardening.

By market gardening we mean growing garden crops in large areas and where individuals are devoting all of their energies to this one line. Market gardens are generally located near large cities (within five to ten miles), where the produce can be taken to market on wagons; yet many are successfully carrying on the business at a much greater distance from market, and shipping their produce by express or freight. There are advantages in favor of both locations. When near the markets one may be able to watch prices from day to day and sell or hold any crop as the market may warrant. Supplies, too, may be bought cheaper, and the cost of transportation both ways will be much less. On the other hand, land near large markets generally commands a high price.

In the country at long distances from markets land is cheap, and one may find that which is adapted to any crop desired. Rotation, too, may be practised on the larger area which the lower prices would render available, whereby crops may be grown with less cost than if the same crop were grown on land continuously cropped, and with the modern methods of transportation by express on both steam and trolley lines produce can be carried at low rates. Moreover the modern commercial fertilizers are made in such variety

and to such perfection that one is not wholly dependent upon stable manure, which is very expensive, especially when hauled a long distance.

In treating of the various market-garden crops in this chapter, the limited space will prevent our going into minute details, therefore only the most essential points will be touched upon.

The Soil.

For the most successful market gardening a variety of soils is a great advantage. For peas, beans, corn, squashes, melons, etc., rather light, warm land is best, while for celery, cabbages, cauliflowers, etc., a deep, moist, clay loam will give the best crops; yet a deep, moist loam, facing south, thoroughly underdrained, will grow almost any crop if properly fitted and cultivated. Even a sandy loam, well fitted with plant food and organic matter, may be made to grow any crop except, perhaps, celery.

Glass Structures Needed.

While one may grow many market-garden crops with profit without glass, it will be found more profitable to have a few hot-bed sash (Fig. 77) or a small greenhouse (Fig. 78) under which to start plants to be transplanted early to the open ground, and thus compete more advantageously with the Southern growers or those more favorably located near by.

Thus cabbage, lettuce, cauliflower, celery, pepper, and other plants may be started under glass and grown to a considerable size, and when put out of doors will mature the crop in a much shorter time than if the seed were planted in the field. The first cost of cold frames and hot-beds is less than that of greenhouses, and they are much less expensive to run, though both require close attention and skill to make them successful and profitable.

For the making, care, and management of cold frames and hot-beds see Chap. VI, page 117.

Small greenhouses have many advantages over hot-beds, and when we consider the cost of sash, mats, and shutters, and the outlay for labor to shovel snow, to



FIG. 77—The Hot-Bed. Note Sash, Mats, and Shutters.

cover and uncover every day, or perhaps several times each day, the cost of the former is but little more than that of the latter. Fig. 78 shows a small, cheaply built "lean-to" house in which large numbers of early plants may

be grown. The labor of running a hot-water or steam heater is much less than the covering and uncovering required for hot-beds, and one can work in such a house with comfort no matter what the weather may be outside and have perfect control of all conditions necessary for success. Better and earlier plants may be grown in the small



FIG. 78—A Small Greenhouse.

greenhouse than under frames, with perhaps the single exception of lettuce, but with this crop the plants may be better started in the house and transplanted to the frames. To run hot-beds or greenhouses requires the closest attention and good judgment. One must learn by actual experience the conditions under which

the various plants are grown, and one can hardly expect to be successful in every first attempt. For directions for the care and management of greenhouses see "Greenhouse Management," by Taft.

In the business of market gardening one must begin planning and work in winter, even if no glass is used. Plans must be fully matured, and seeds, fertilizers, tools, etc., must be on hand for prompt use the moment conditions are favorable for out-door work. During the month of January we may decide what crops to grow, what fertilizers to use, what methods of growing to pursue, and learn as far as possible what others are planning to plant and what the market is likely to be. In February we should have our seeds and all other supplies on hand and decide when and how we will start our seeds, if under glass or in the field, get manure on the land, make up the early hot-beds, etc. See that all tools are in working order.

In March at the South and along the coast, garden work is in various stages of development, from almost full maturity of crops at the South to the starting of the seeds at the North, fitting the land, sowing the first seeds of onions, peas, radishes, etc., out of doors. In April we uncover the rhubarb, clean up and harrow the asparagus bed, get in seeds of the more important market-garden crops promptly and in rapid succession. As the season advances one crop follows another as the first matures until the last planting of beets, cabbages, and cauliflower in July and August, and turnips last of all.

Fitting the Land.

The more quickly vegetables are grown the more succulent and desirable they are. Therefore the land must be made very rich to start with, and many market gardeners start by applying fifteen to twenty cords of

stable manure per acre and expect to obtain at least two and sometimes three crops from the same land in a season, though often using a liberal dressing of commercial fertilizer to help bring on the last crop. Each of the principal market-garden crops will require special treatment of the details of which our space will allow only a brief mention, but the reader is referred to the following books: "Vegetable Gardening" (Green), "How to Make the Garden Pay" (Griener), "Success in Market Gardening" (Rawson). We note the most important points to be considered in growing the following crops:

ASPARAGUS.

This crop succeeds best in a light sandy soil, free from small stones if possible. Plants are started from seed sown in the spring in long rows or beds as carrot or onion seeds are sown, and to make the best plants are thinned out to two inches apart. They are in the best condition for planting the following spring, though many prefer to set plants two years old.

Planting.

The land is plowed as deeply as possible with a single plow or, better, the subsoil or trench plow may follow it, thus working the soil from twelve to fifteen inches deep. After thorough harrowing it is furrowed deeply five feet apart, the plants to be set eighteen inches in the row. If a large plow is used and run two or three times in a furrow they may be made from eight to ten inches deep, which is the best depth for setting the asparagus plants. Manure or fertilizer may be used in the furrow before the plants are set, or it may be spread on broadcast before plowing. The plants are set about eighteen inches apart and covered with only a few inches of soil well pressed upon the roots with the feet.

When the plants are well started the trench is gradually filled until, about the middle of July, the land is level. To secure the most profit, from one-half to one ton of high-grade fertilizer or its equivalent in chemicals, or five to ten cords of good stable manure should be applied each spring and thoroughly harrowed in before growth begins.

If the growth has been large cutting from the young bed may begin the second year, but if small not until the third year, the first time of cutting being only for three or four weeks, increasing the time until the old beds are cut from April to the middle of June. The stalks are cut when from six to eight inches long, with a forked knife, a little below the level of the ground. These stalks are tied in small bundles or bunches of various sizes for different markets. The size most in use is such that thirty-six bunches standing on end will fill a bushel box full level with the top. In gathering, all stalks are cut; the very small and imperfect are dropped to the ground as cut, or thrown out as the stalks are bunched. Bunching is done with an adjusted buncher by which the exact size is obtained and the bunch firmly held in place until tied. Tying is done with raffia fibre, which is strong and flat and does not cut into the stalks when drawn tightly, as it must be to have the bunch hold together as it is handled in marketing. This is one of the most profitable crops, selling at from \$1 to \$3 per dozen bunches, according to the season and the supply. Several varieties are cultivated but the kinds most grown are Connover's, Barr's Mammoth, and Palmetto, there being little choice in them except that perhaps the last is less subject to rust than the others. Fig. 86 shows how this crop and poultry may be combined; during cutting small chickens may be allowed to run over the bed and after cutting, all,

young and old, may run. Thus insect pests are destroyed, the weeds are killed, the ground cultivated and fertilized.

BEANS.

A light warm soil is best for beans, and they may be sometimes grown as a second crop, following any crop that is off the land by the 1st of July, though for early market they must be planted as soon as the soil gets well warmed up and the danger of frost is past. It is a desirable crop with which to fit new land for a crop like melons, strawberries, tomatoes, etc. It is also a good crop for orchards, as it draws much of its nitrogen from the air. In heavy land the seed should be covered but lightly, but in light land and in a dry time they may be covered two or three times their own thickness. The land should be cultivated frequently, but not when the leaves are wet, as if done at this time it is thought to cause a blight upon the leaves and fruit.

Varieties.

Nearly every variety has its "bush" and "pole" forms, the former of which requires no poles. The pole beans, however, generally yield larger crops than the dwarf or bush forms. Beans are marketed in three ways, as "string," "shell," and dry beans. The first are picked while the pods are yet tender; the second are picked while the seeds are tender yet full grown. All varieties may be used as dry beans for baking, though the small, white, yellow-eyed, and red-eyed varieties are grown especially for this purpose.

Among the best varieties for general use are: String beans—Dwarf Golden Wax, Early Valentine, Early Six Weeks; Shell beans—Pole Horticultural, Dwarf Horticultural, Kentucky Wonder, Burpee's Dwarf Lima;

Field beans—Boston Pea, Marrowfat, Red-eyed Pea, Yellow-eyed Golden-podded. The last is valuable as a string bean and for winter use.

BEETS.

Beets are a profitable crop and easily grown. They may be put into the market bunched from the hot-beds or greenhouse, or early from the field from transplants from the house or hot-bed. On rich land with a southern exposure the seed may be sown as soon as the land will work up fine and mellow, and they are profitable as a late crop following any crop that matures by the middle of July. The seed is sown in drills fifteen to eighteen inches apart and the plants thinned out to two or three inches apart. The early crop is sold tied in bunches of five, and sell at from 25 cents to 50 cents per dozen bunches. To keep up a supply of tender beets for home use or the market, seed must be sown at two or three different times, the last sowing to be not later than August 1st. The late crop should be harvested before severe freezing weather, and to keep them from wilting in a dry cellar they should be packed in slightly moist soil or leaves. The late crop is sold by the bushel, bringing from 50 cents to \$1.00 per bushel.

Varieties.

The kinds that are most grown are Egyptian, Dewing's Improved, Edmunds, etc. For poultry as a winter feed the mangel-wurzel is largely grown.

CABBAGES, CAULIFLOWERS, BRUSSELS SPROUTS, ETC.

These being closely related may be treated under one heading. With the cabbage the development is in the form of an enlarged bud; in the cauliflower the flower-stalk is enlarged and fleshy; while in the sprouts small

solid buds are formed in the axil of the leaves. They are all gross feeders and all do well when planted in new, rich, moist soil—*i.e.*, land recently in turf.

For the early crop of cabbages the plants are started under glass, the aim being to have large, well-hardened plants ready to put out as soon as the danger of severe freezing is past, an ordinary frost not injuring them if well hardened, though frequent freezing and thawing would do so. The land should be made rich with stable



FIG. 79—Late Cabbage, following Strawberries. Blackberry Field in the Distance.

manure or fertilizer containing a large amount of potash.

No crop is more benefited by frequent cultivation than the cabbage group, and in the field they may be so planted that the horse may do all of this work until the leaves cover the ground and would be broken off by the cultivator.

The early crop is grown so as to be marketed from July to September, and the late crop in October to midwinter (Fig. 79). The large-growing kinds are

planted three to three and one-half feet, and the smaller two to three feet apart. In the local market they are sold by the piece, but they are shipped in barrels, the weight being about 100 pounds per barrel, and they sell for from 50 cents to \$1.50 per barrel. Cabbages are wintered in trenches or in cold cellars. The trench is made in light soil and on a slope. First a deep furrow is plowed at the top of the slope and the heads on the stump, with the outer leaves pulled off, are placed in an upright position in this furrow, the soil being pressed firmly under the head. Then another furrow is plowed, throwing the soil up against the first row, and so on until all are "trenched." This should not be done until freezing weather, and if the weather should be warm after they are trenched only a light covering of soil should be put over the head, until the frost is an inch or two thick. As the weather grows colder more covering must be applied, but it requires good judgment to cover just enough but not so much as to cause decay. From this trench the cabbages may be taken out at any time during the winter or mild days, and trimmed for market.

Varieties.

For early market—Etampes, Early Jersey Wakefield, Early Summer. For second early market—Winnigstadt, all seasons. For late market—Danish Ball Head, Flat Dutch, Late Drumhead, Purple Drumhead, Improved Savoy.

The Cauliflower.

The cauliflower requires practically the same treatment as the cabbage as to soil and cultivation, but needs more care in starting the seed and a richer soil. A moist seed-bed of fine rich soil must be provided and

the seeds covered but lightly with fine soil. If the bed is much exposed to sun or drying winds, a sheet of cheesecloth or burlap should be stretched over the bed during the dryest part of the day, until the seeds are well up, or a light covering of fine sphagnum may be sifted over them. More care is required in transplanting the cauliflower than the cabbage, but otherwise the cultural treatment is the same. When the heads begin to form the outside leaves are drawn together and tied with a soft string or raffia to keep the heads white. They must be marketed while solid and are packed in bushel or barrel boxes so as not to injure one another, one layer only in a box. From four to six are packed in the bushel box and from ten to fifteen in the large boxes. Cauliflower sells at from 5 to 25 cents per head, thus making it a profitable crop where one has just the right conditions for the growth.

Varieties.

The varieties most grown are Early Snowball, Dwarf Erfurt, and Le Normand's Short-stem.

Brussels Sprouts.

Many people are fond of these little "bud cabbages," and in large markets they are in good demand. They require the same treatment as the cabbage. For market they are picked as they mature, the lowest first and the others as they come to maturity, and are sold by the bushel to the wholesaler, to be retailed by the quart or half-peck.

Varieties.

Dreer's Select Matchless and Long Island Half-dwarf are the more popular kinds now cultivated.

CARROTS.

This crop is grown for table use and for feeding cattle and horses. It is one of those crops the planting of which may be put off until all other crops are in the ground, or it may be planted at the time of planting beets, parsnips, and onions; but the early sown crop will be too tough and woody for table use in winter. When sown late the growth is largely made during September and October, and they are then very crisp and tender, just right for table use, but the crop will not be as large as when they are sown early. The soil best suited to the growth of the carrot is a deep, sandy loam, made rich by a liberal dressing of stable manure plowed under and a little fertilizer sown broadcast just before the sowing. The seed is sown in rows fifteen to eighteen inches apart, or in beds of three rows one foot apart and three feet between the beds, so that the horse cultivator may be run through them frequently. The plants are thinned out to two inches apart. The size most desired for table use is from one to two inches in diameter, which sell for 50 to 75 cents per bushel. For stock feed they sell for from \$10 to \$15 per ton.

Varieties.

The variety most grown for stock feed and table use is the Danvers Intermediate, and for the table alone Early Short-horn.

CELERY.

This crop is not generally profitable except upon deep moist land like strong grass land or reclaimed swamps, though if the land is made very rich with a heavy dressing of stable manure it may be grown in a cool moist season upon a deep sandy loam. It is grown as a second crop following strawberries, potatoes, early beets, or

any other crop that is off the land before the first of August. It is often grown among onions, every fifth row among this crop is omitted when the seed is sown and later set with celery plants, or the seed is sown in the row. Plants are generally started in the greenhouse or frames, or sown in a sheltered place outside, about the first of April. The seed is very fine and requires only a very light covering, and the surface of the bed must not become dry until the seedlings become well rooted. This is prevented by covering the bed with a sheet of cheesecloth, which prevents the soil from being washed when watering, or by sifting over the seed a thin covering of fine sphagnum moss. When the seeds begin to germinate so as to slightly raise the cloth it is removed and the bed kept shaded for a day or two until the plants get well rooted. The seedling plants are transplanted, when the third leaf appears, two or three inches apart.

For early market the plants are set in the field the last of May or early June, and for the late crop they may be set as late as August 1st if the soil is rich and moist. In extremely dry weather, frequent cultivation must be given or water applied. Plants that are not growing as desired may often be started into vigorous growth by plowing a furrow away from each side, scattering a little nitrate of soda or fine poultry droppings into it and turning it back again.

Celery is prepared for market by first blanching the stalks. This is done in two ways—by boards set up against each side of the rows and held in place by stakes, or by banking with soil. The latter method is thought to produce a better quality, but is much more expensive than the former.

In banking with soil, the plants are grasped with both hands and drawn closely together while some fine dirt

is packed about them, holding them in place until more soil can be banked against them. When properly blanched the plants are dug up, the roots cut off close up to the stalks, the outer leaves pulled off, and two or three plants tied together for a bunch. This is sold at from 75 cents to \$2 per dozen bunches, depending upon the quality and supply. Immense quantities of celery are grown on the reclaimed meadows about Kalamazoo, Michigan, and in other similar soils, but the demand is increasing faster than the supply.

Celery is stored in winter in cold cellars and in pits. Any cellar where the temperature can be kept nearly down to 32° will keep celery if properly packed. A celery "pit," a cheap structure, is made partly below ground by setting up posts about two feet high upon which a roof is placed; the sides are double boarded and the soil from the inside thrown out and used to bank the outside, thus making the inside walls three to four feet high. When the pit is ready to receive the celery the plants are dug, the outside leaves pulled off, and the plants then packed closely with moist soil about the roots. Success in storing celery depends much upon the skill of the grower in keeping a low even temperature. As cold weather with danger of freezing comes on more covering may be needed over the roof and sides of the pit. Thermometers should be hung inside and out, and should be frequently consulted. At the North, celery must be in the pit in average seasons by November 15, but one must be ready to put it in two weeks earlier should cold weather come on. When skilfully managed celery may be kept in a pit until April 1st.

Varieties.

Among the leading varieties are the Golden Self-blanching, Grant Parcal, and Boston Market. The lat-

ter, while of the best quality, is rather difficult to grow, as it is subject to the celery leaf-blight.

SWEET CORN.

Sweet corn is grown more as a farm-garden crop than as a market-garden crop. Only one crop can be grown on the land where corn is cultivated, as it takes nearly the entire season for it to grow to maturity. It makes a good crop with which to reseed land that has been long in cultivation, or to break up coarse land and fit it for market-garden crops. Sweet corn is largely grown near canning factories, and the fodder is utilized in making milk. The early crop is generally the most profitable, and a warm southern exposure and a rich warm soil is necessary to produce this. The land should be plowed the fall before and again in the spring and thoroughly fitted. If planted very early, furrow out three feet each way, making the furrows rather deep. Then at the intersections of the furrows place one or two shovelfuls of fine heating horse manure. If this is very dry or the land is not decidedly moist, tread it down and cover with two or three inches of fine soil and plant six to eight kernels in each hill. Cover very lightly if the soil is wet, but an inch or more if dry, and press the soil firmly about the kernels.

There is not much gained in very early planting unless the soil is well warmed by the sun or stable manure, but a crop may sometimes be planted as early as May 1st at the North with the chance of its escaping late frosts, in which case it will be very profitable. A second planting should follow this in a week, which often will mature nearly as early as the first.

Frequent cultivation must be given, and if the weeder is used several times after the cultivator the crop may be grown without the use of the hand-hoe.

Varieties.

Many varieties of sweet corn are found in the market but the one best known and in demand should be grown. Among the best are the Crosby, Excelsior, Country Gentleman, Golden Bantam, and Evergreen.

LETTUCE.

This is a home-garden crop, yet is one that is largely grown for market the year around. From November to May at the North it comes from the greenhouses and frames, or from the South, where it may be grown outside the year around. To keep up a supply of plants seeds must be sown every two or three weeks.

The varieties most in demand are those that form a solid head like that of the cabbage, and to obtain this plants must have a space of from six to eight inches each way. They generally head better if transplanted once or twice.

The crop is marketed in bushel boxes or sometimes for long-distance shipment in barrels, and sells at from 25 cents per dozen during the summer to \$1 and \$1.50 when the supply is scarce.

Varieties.

Among the best varieties are Big Boston, Black-seeded Tennis Ball, Salamander, Grand Rapids, and Hittinger.

MELONS.

This crop is of but local interest, as it can only be successfully grown in favored regions. In almost all old settled sections of the country it is a very uncertain crop on account of blight and the attacks of insects. For the best results a rather thin new soil is needed, made rich with manure placed in the hill, which should

be raised a little above the level to carry off the surface water quickly. The seeds should not be planted until the ground is well warmed, in this section not until the last of May or early June. If grown in large areas the work may be done largely by the horse and the crop grown at small cost.

Varieties.

The varieties most grown are: Muskmelons—Rockyford, Paul Reese, Miller's Cream. Watermelons—Sweetheart, Kolb's Gem, Alabama Sweet.

ONIONS.

If one has deep sandy loam free from stones, and not too full of weed seeds, this crop will be found profitable. For the best results the land should be plowed in the fall, and if a light dressing of manure be turned under it will insure early working in the spring. In the spring the land may either be plowed or deeply harrowed, applying any good vegetable fertilizer at the rate of from one-half to one ton per acre. The land must be worked fine and mellow, and if there is any coarse material on the surface it should be raked off so as not to clog the seed-sower. The seed should be sown as early in the spring as possible. The cultivation required consists in running the wheel- or scuffle-hoe so frequently that no small weeds will become established between the rows, and in hand-pulling all weeds growing in the rows. Weeds can be most cheaply killed when they are just bursting through the soil. If they are brought to the surface at this time with the hoe or rake, or covered with a little soil, that is all that is needed.

When the tops begin to turn yellow they should be pulled and thrown in thin windrows and frequently turned until dry.

In very wet weather it is sometimes necessary to move the crop to some dry barn floor, shed or loft, for when new roots begin to form on mature bulbs it is very difficult to stop continued growth. To prepare for market the dry tops are cut off with scissors or sharp knives, the onions sorted, and put in sacks. The yield varies greatly under different conditions of soil and season, from 100 to 1000 bushels per acre being produced. Onions are not injured by light freezing and may be kept over winter in a cold, dry cellar or any cold, dry room that does not freeze. They are also kept by placing in a cold loft, freezing them lightly and covering with hay, when they will remain frozen or thaw out very gradually, but should not be handled when frozen.

Varieties.

Among the varieties most grown are the Danvers Yellow Globe, Red Wethersfield, Southport White Globe, Prize Taker.

PEAS.

This is another crop adapted to the farm garden. It is generally grown on cheap land and with commercial fertilizer. The income from the crop is not large, but as it can be grown cheaply when it is harvested early there is a good profit from it for the time and money invested. Early, warm land sloping to the south, should be selected, and plowed in the fall and again in the spring, unless it be turf land, in which case the wheel-harrow run deeply will suffice, making it fine and mellow as early as possible. The seed is better planted with a corn-planter or other seed drill, as the plants will then be in better line and more easily cultivated with the horse or hand wheel-hoe. The fertilizer can be drilled in with the seed with an attachment to the seed drill.

As soon as the plants break through the ground a

cultivator with wings or a very small plow should be run between the rows, throwing a little soil over them, and then the weeder or rake run over all. This will kill all small weeds and level down the rows. In a few days or a week the weeder should be run again, on a bright drying day, then the winged cultivator or small plow, throwing fine soil close up to the plants. If after another week a more heavy furrow of soil be thrown up against the plants all of the weeds will be smothered so that no hand work will be needed unless it be to pull a few large weeds in the rows.

Dwarf varieties that require no bushing are most grown, but the tall kinds will generally yield larger crops, though the expense of growing is greater.

Wire poultry netting eighteen inches or two feet wide will be found very satisfactory for supporting the tall-growing sorts, and if taken from the stakes as soon as the crop is harvested, rolled up and put in a dry place until the next season, it will last a lifetime. Peas are marketed in bushel boxes and sell for from 50 cents to \$2.50 per bushel, according to season and supply.

Varieties.

Among the best varieties are: Dwarf—Alaska, Nott's Excelsior, Surprise, Premium Gem, American Wonder. Tall—Champion of England, Stratagem, Telephone, White Marrowfat.

POTATOES.

The potato is properly a farm crop but is used by market gardeners as a rotation crop and to fit rough land for crops that require a fine soil. Under the best conditions from 200 to 400 bushels are grown upon an acre, and when the work is largely done with the horse as it should be there may be considerable profit in the crop. The ideal conditions for its best growth are a deep,

rather moist loam, well underdrained, with a clover sod turned under in the fall and shallow plowed or thoroughly harrowed in the spring. About ten bushels of seed per acre is planted, cut into pieces of one or two eyes, and the earlier this is planted after the ground will work up fine and mellow the better, as there will be less trouble from insects, and very early potatoes generally sell higher than the average of the main crop which comes on later. For large areas the seed is planted and fertilizers distributed by the planter, of which there are many kinds that do good work. From one-half to one ton of high-grade potato fertilizer is used per acre, sowing one half with the seed and the balance when the plants are just breaking through the ground, and at the first cultivating. At this time a winged cultivator should be run between the rows, covering the plants and smothering all small weeds. In a day or two the weeder may be run and the field smoothed down, and again in a few days or a week the cultivator should be run followed by the weeder, when another lot of small weeds will be destroyed. The next cultivation should be done with the cultivator with winged teeth, or a small double-mouldboard plow or potato-hiller, throwing fine soil up close against the plants. If the cultivator is run between the rows once or twice after this to keep the soil fine and mellow, and the hiller once more, this will take care of all the weeds unless the land is very weedy. A large weed here and there may have to be pulled to prevent stocking the land with seed for the next season.

When the potato-bugs appear the tops should be sprayed with the Bordeaux mixture and Paris green, to kill the bugs and prevent the blight. A second and even a third spraying may be needed if the weather is favorable for the growth of bugs and blight.

When the tops have fallen down and begin to turn yellow, the crop may be dug and sold, or stored if one has a cool, dry place in which to put them, but they are as likely to keep well in the ground as in a moist, warm cellar. Where there is a tendency to decay, dusting with air-slacked lime or plaster to take up the moisture will often stop this tendency. For digging large crops the potato-digger will be found very economical, though it requires a very heavy team to draw it, especially if the ground is moist and heavy. They should be dug in bright, sunny weather, but not put into bins until well cooled off. Potatoes keep best at a temperature of 40°. A continued temperature of 33° to 35° often chills the potato so that they become sweet and do not sell as readily as when kept at a higher temperature. The price this crop sells for varies from 50 cents to \$1.50 per bushel, the average for New England being about 80 cents.

Varieties.

Among the standard kinds are the following in order of earliness: Irish Cobbler, Bouvee, Beauty of Hebron, Early Ohio, Rural New Yorker, Carmans No. 1.

RHUBARB.

This is an early and often a profitable crop on a warm, rich soil with a southern exposure, and one that may be forced by placing sash over the beds in the spring or in the winter by putting the roots into a warm cellar—a single old plant will often make a dozen new ones. To obtain large stalks, roots containing one or two buds (Fig. 34), are set out in the spring or early summer and kept growing all summer, and in the fall the ground is covered with six to eight inches of stable manure to prevent deep freezing. In the spring the coarsest of this should be removed and the finer spaded in about the roots on a bright, sunny day. This will cause an

early start and rapid growth, and the early out-door crop often sells for from five to ten cents per pound.

This crop may be forced under the benches of a greenhouse or in a warm house or stable cellar. Strong young plants of two to three buds are dug just before the ground freezes and with a little soil upon them packed upon the north side of a wall or shed to freeze. After freezing for a few weeks they are packed closely under the bench, in the cold frame, or in the cellar with a little soil about them, where they are to be forced. A temperature of about 40° should be kept up at first, gradually increasing it until it runs to about 50° at night and 60° to 70° during the day. No light is needed, the stalks being longer and of a more delicate color in darkness than in light. Rhubarb is sold by the pound, in some markets, tied in one, two and three pound bunches, but in others it is sold loosely in bushel boxes.

SQUASHES.

Squashes, like melons, require a great deal of heat but are not as much subject to disease as the latter. It is a sort of chance crop, for if planted very early it is often destroyed by bugs or maggots at the roots, or if planted late to escape these pests the crop is often cut off by frosts or fails to ripen so as to keep well. It is a crop that can be cheaply grown, and when it does escape the many chances it is often a very profitable one. For the best results newly turned over turf land is generally selected. It is deeply plowed, worked very fine and mellow, and furrowed in squares 6 x 6 feet. Manure or fertilizer is placed at the intersections and thoroughly worked in, raising the hill a few inches above the level that surface water may run off quickly. From five to ten seeds are planted in each hill from the 1st to the 10th of June for New England, covering them one-

fourth inch deep in moist land and one-half inch if the soil is thin and dry. As soon as the seeds break through the ground the plants should be dusted thoroughly with plaster with a little Paris green in it to keep off the insects, striped beetles and black squash-bugs. The winged cultivator should be put through the rows diagonally, throwing the soil up close to the plants. As soon as the insects are through working all weak plants are pulled out, leaving three in each hill. The second cultivation may be with the plow lengthwise of the rows, throwing more soil against the plants, and the third also with the plow, throwing up more soil. If the land is very weedy a little hand hoeing may be needed just about the hills, and before the plants get to running much the cultivator should be run diagonally again, and possibly lengthwise between, to kill small weeds and keep the soil well stirred. No more care will be needed unless it be to pull a few large weeds in the hills that may have escaped the cultivator.

Squashes must be harvested before frosty weather, as even a temperature just above freezing may injure their keeping qualities. When the danger of frost is pronounced, a temperature of 45° at 5 P.M. and going down, squashes are generally thrown in piles, if they cannot be carted to the barn or shed, and covered with the vines, and the following day carted to some place where they may lie in the sun during the day and be covered at night.

When the ripening process in the sun is completed or danger of freezing is past, they are placed in a dry, warm shed, loft or cellar. They will keep best at a temperature of 52° and a very dry atmosphere in a dry shed, squash house, chamber, or furnace cellar.

The crop is sold in barrels or bushel boxes, the price ranging from one-half cent to two cents per pound.

Varieties.

Among the best varieties for market and home use are: Delicious, Hubbard, Golden Hubbard, Boston Marrow, and Essex.

TOMATOES.

This is a market-garden, a farm-garden and a canning crop. It is grown largely to supply city markets, and in some sections in large areas to supply canneries. For the best results land upon which some well manured crop was grown the previous season is selected. It is plowed in the fall and again in the spring, and made ready for the plants from May 1 to June 1, according to location. The land is generally furrowed or marked out 3 x 5 to 4 x 6 feet, according to soil and variety grown.

Plants for the early crop are grown under glass, started from seed from February to April 1, and transplanted at least twice until they occupy a space 6 x 6 inches in the bed. When the plants are ready for setting out a small amount of fertilizer is scattered about each hill, a spadeful of soil taken out, the plant taken up with a spade, dropped into the hole, and soil pressed firmly about the roots. A moist day should be selected if possible or the plants set out from 4 to 6 P.M., that they may have the night in which to recover from the effects of transplanting. For a few days before moving water should be withheld from the plants to cause them to harden and turn a little yellow, but the bed should be thoroughly wet down a few hours before the plants are taken up, to cause the soil to adhere to the roots. Thorough cultivation should be kept up both ways between the plants with the horse as long as the plants stand upright, and after they begin to fall down large weeds must be hand pulled.

When sold to canneries the crop is harvested in bushel boxes and sent without much packing, but for city markets it is carefully wiped, sorted and packed in layers the stem end down, thus presenting a beautiful appearance. Prices vary according to variety and season from 50 cents to \$2 or more per bushel. Cannery prices are made for the season and range from 30 cents to 70 cents per bushel.

Varieties.

Among the best varieties are the Acme, Beauty, Paragon, New Stone, Dwarf Champion, and Dwarf Stone.

TURNIPS.

This is a cheap crop generally grown on land cleared of other crops late in the season. In good soil the English varieties will mature when the seed is sown as late as the 15th of August. It may be planted after beets, peas, early sweet corn, cabbages, strawberries, etc., and with little or no labor large crops may be produced which are valuable for stock and poultry feed, and to a limited extent for table use. They do best when sown in drills but good crops are often grown when sown broadcast. Superphosphate is especially valuable for the crop. The Swede, French and Ruta Baga turnips require a longer season than the English varieties. The seeds must be sown as soon as July 1, more cultivation given, and the plants thinned to four to six inches apart in the drill. The latter are grown for cattle and sheep, and to a limited extent for table use.

Varieties.

Among the best English varieties are White Milan, White Egg, White-top Strap-leaf, and Red-top Strap-leaf.

CHAPTER XII

POULTRY KEEPING

POUULTRY, fruit growing and market gardening is one of the best combinations for earning a living on a small place in the country. All three require close and constant attention. Some one must be at home all the time that the work be promptly done when needed, as a little neglect at the critical time may result in great loss with either.

The routine work of fruit growing and market gardening was discussed in previous chapters and it remains for us in this chapter to outline the work of poultry growing.

The poultry interest of the country is greater than that of any other one branch of agriculture, the products amounting in a single year to over \$360,000,000. It has grown to this vast volume in a comparatively short time, and there is hardly a country home where hens, ducks, geese, or pigeons are not kept. Many families produce their own supply of eggs and poultry, others pay their grocery bills from the products of the poultry yard, and still others obtain their entire support from their poultry; and there are large establishments where thousands of fowls are kept and large capital is invested in the equipment of extensive poultry houses and yards.

A noticeable feature of the country poultry yard are the fruit trees planted in it for the shelter of the fowls and the production of large fruit (Fig. 61), raspberries, black-

berries and even grapes and asparagus. Poultry houses and yards serve as a good location for rotation of crops. Many yards may be found where small colony houses



FIG. 80—Movable Summer Colony-House for Fifteen Hens; Open View.

(Figs. 80, 81) and frames are moved to new locations every week, and where after a time the land covered by them is plowed up and produces famous yields of



FIG. 81—Movable Summer Colony-House for Fifteen Hens; Closed View.

almost all farm and garden crops. The droppings, too, of the fowls, which should be frequently gathered from under the roosts, are especially rich in soluble nitrogen and other valuable elements, and are used in place of quick-acting commercial fertilizers.

The Location.

A light sandy soil with a southern exposure well sheltered from the north and west is generally selected for poultry, but the most important condition is a dry soil and quick surface drainage. Very steep hilly land should be avoided, as in heavy showers the soil is often badly washed and houses and yards much injured. Stony land and land covered with brush may be used as ranges, but if fruit trees are to be planted the



FIG. 82—Poultry in the Raspberry Patch.

brush must be first destroyed by digging out or frequent cutting and close feeding by the fowls. Fruit planted in poultry yards must be adapted to the soil occupied. Thus, peaches must be planted on rather light soil well elevated, with somewhat of a northern or western exposure. Plums may be grown under similar conditions, doing well on a heavier soil if in full exposure to sunlight and air. The apple and pear succeed upon any good grass land, but it must be well underdrained, while the quince will grow in a very moist soil or one like that suited to the apple and pear. Rasp-

berries may be grown upon almost any kind of soil in the poultry yard (Fig. 82), if not too wet, but the plants must be allowed to reach mature growth before the fowls are let in, and during the early summer they must not be allowed to feed on the new canes so as to injure them. With the rapid growth of weeds and other plants in the rich soil of the poultry yard this is not likely to happen, unless unusually large numbers of fowls are kept in small enclosures.

The business of poultry growing may be started from very small beginnings. A few settings of eggs and some hens bought in the spring or borrowed from a neighbor may serve as a nucleus. From each setting with close attention and care one may expect ten to twelve chicks and a small flock may be almost entirely supported from the waste of the table and the products of the garden.

One may start in this business in a more extensive way by the purchase of a small flock or the use of the incubator. If one has a warm, dry cellar or small room where the temperature runs evenly, and has the time to watch it closely until he becomes skilled in running it, the 50, 100, 200 or more egg incubators will give a larger start, but the first expense for incubator and feed for the chicks will be considerable before any income may be expected from broilers, or poultry. One should begin and proceed in a moderate way until all the details of the business are well understood, for few lines of business require such exact knowledge and prompt treatment as poultry keeping.

POULTRY HOUSES.

The first move in poultry raising after the location has been decided upon is the kind and number of houses required. Expensive houses are not needed but they

must be warm in winter, yet well ventilated. A barn- or shed-cellar opening to the south makes an ideal place for small flocks of fowls, but it must be dry. It may be kept open in all but stormy weather, if a warm place is provided for the fowls at night or in extremely cold weather. Curtains of burlap or loosely woven cloth will answer the purpose of glass for doors or windows in houses that are closely built.



FIG. 83—A Modern Poultry House with Scratching Shed
Between Two Pens.

Of special houses there are two or three types in general use—the colony house where twenty to fifty fowls are kept (a very satisfactory colony is shown in Fig. 83), the long range of houses where the same number are kept in separate pens, and the large, high and well lighted house where several hundred are kept together. The small colony house is most cheaply built from the fact that light and cheap building material may be used, but it is exposed to the weather on all four sides and therefore needs the best possible protec-

tion from cold. The long range of houses with many pens joined is also an economical house to build, as the pens or sections are divided by wire netting or curtains, thus reducing the amount of wall space for each pen. This house also has the advantage that in caring for the fowls in stormy or cold weather one can pass from pen to pen without going out of doors. The main advantage of the large house with a large number of fowls in one room is in the feeding and care, especially where the dry mash system is practised. Here dry food may be placed in slatted troughs, where all the fowls may help themselves. Enough dry grain may be scattered in the litter for all at once, and a sufficient supply of water be provided. Then the studs being high there is a better circulation of air than there is in smaller buildings.

Building the Houses.

At the North poultry houses must be built so as to be warm in the coldest weather, yet the fowls do much better if allowed to run a part of each day in a dry cold place where they must scratch to keep warm. In the living room the temperature should range from 40° to 60°, according to whether the sun shines or not, but water should not freeze much during the night. A warm house is cheaply obtained by using lining paper over rough boards. Many people put building paper on the sides of their hen houses, but leave the spaces between the rafters without the paper, and when cold weather comes on the cold air drops down from these surfaces and the houses are damp and cold. The soil, too, close up to the houses freezes and the frost works in under the building and we have a cold, damp floor for the fowls. To prevent this a space three or four feet from the walls of the building must be covered with

from six inches to a foot of hay, straw or leaves to keep frost from working in through the soil. For inside covering ordinary building paper or tarred paper may be used and is comparatively inexpensive, but the heavier roofing papers like rubberoid, flintcoat, amelite, paroid, etc., are more economical for the roofs and outside walls. These if painted with tar or asphalt make very durable roofs. Shingles with building paper under them make a very warm and desirable covering for either roofs or sides of poultry houses.

CARE OF THE FOWLS.

Cleanliness and an abundance of light, fresh air and water are the most important requirements for successful poultry keeping, but closely following these an abundance and variety of food must be given with a good place for exercise and a warm place in which to roost in very cold weather.

The houses should be frequently cleaned out, and the roosts or droppings boards be cleaned every two or three days if a large number of fowls are kept. Scattering a little dry dust like sifted coal ashes or land plaster over the droppings will make this cleaning unnecessary more frequently than once or twice a week unless the fowls get into the droppings and scratch them about. The droppings should be placed in barrels and kept perfectly dry until sold or put upon the land. A coating of lime wash should be put over the entire inner surface of the house two or three times every year, adding a little dissolved copper sulphate and kerosene to prevent the germs of disease and lice and mites from increasing. An ounce of the copper sulphate dissolved in hot water and a half pint of kerosene will be sufficient for eight to ten quarts of wash.

RAISING CHICKENS.

For the most profit in this work one must make a start early in the season. A warm house or open cellar is a necessity. Eggs must be set under hens or put into the incubator in March or earlier, and to produce fertile eggs, which is the chief difficulty at this season of the year, the hens must have a great variety of food and

be allowed to run outside whenever the weather is favorable.

It is difficult to find hens that want to set at this time, but with the incubator (Fig. 84) one is more or less independent of this condition.

If hens are used, they should be set in a room or space where other hens will not interfere with them. A large number may be kept in one room



FIG. 84—A Model Incubator; One of the Necessities for Profitable Poultry Raising.

if each has a separate box that may be kept closed except at such times as they are to be let out for water and feed. An old strawberry crate makes a good box for the nest. As soon as the eggs begin to hatch the chicks should be removed from each hen and taken to some place beyond the hearing of the other setting hens. A large number may be given to the hens which are to take care of them (twenty or even thirty chicks may be taken care of by one hen if in a warm and roomy place), or the chickens may be placed in brooders (Fig. 85) in which artificial heat is supplied by a lamp or in large brooder heated by

steam or hot-water pipes. There are many different kinds of small brooders many of which are very satisfactory, or one may make a simple one that will do very satisfactory work, the heat coming from a kerosene lamp supplied with the Trench or some other burner, the flame of which will not increase in size as the lamp and surroundings rise in temperature. A regular, even temperature must be kept up both in incubator and brooder.

For success with the incubator one needs a warm and fairly dry cellar, with an even temperature, that the heat and moisture in the hatching



FIG. 85—A Model Brooder, where the Chickens are Kept After Being Taken from Incubator.

chamber may be kept at the required point. Success in running these "wooden hens" depends much upon how skilfully one can run the lamp, regulate the moisture, and care for the other parts of the machine. This must be learned with each kind of incubator, many of which are to be found in the market. Full directions accompany each machine and should be carefully followed. The one shown in the picture is largely and successfully in use. As with the hen the chicks should be removed from the incubator as soon as they hatch and carefully protected in the brooder.

Feed for Chicks.

No food need be given the chicks the first twenty-four hours, but fresh water should be before them in very shallow pans or watering fountains where they cannot

get themselves wet. Dry feed should be given them for some time, some poultrymen even feeding only dry feed at all times. Chick food, a mixture of cracked grain, corn, oatmeal, and small seeds, can be had at all supply stores and is safe to use, but expensive; or a mixture of fine cracked corn, oatmeal, wheat shorts, etc., may be fed. Where but few chicks are kept bread crumbs will answer very well for the first few days. Fresh and clean water should be before them at all times, as well as fine sharp sand or grit, and milk will supply the animal food needed.

There is much variation in the practice of different poultrymen as to feed, some giving each day a mash of soft food made of a mixture of ground grains, potatoes, scraps, and other materials, while others feed only dry feed. The latter practice seems to be growing; it is a safe one to follow, and reduces the labor in caring for the flock to the minimum. Young chicks should be fed what they will eat up clean three or four times each day until they can run about vigorously, when three times and finally twice a day, will be sufficient. Care must be taken that they have warm and clean quarters, especially at night. If allowed to huddle together, as they are inclined to do, their lodging place soon becomes foul and unhealthy. Early hatched chickens, those that come out in March and April, will be large enough to sell as broilers in June and July, and will often sell at from 30 cents to 50 cents per pound, according to the supply and quality, thus giving some income from the investment and reducing the cost of keeping a large flock of rapidly growing fowls. After the season for broilers at good prices is past, it is the best practice to separate the cockerels from the pullets and fatten them as quickly as possible for poultry, though, when care-

fully fed, poultry of larger size will often sell profitably during the fall and early winter.

During the summer chickens do best if allowed full freedom, and by growing such crops as asparagus, (Fig. 86), fruit trees and the bush fruits only, a full range may be given by keeping them in small colony houses (Figs. 80, 81) at night. They cannot be given range where succulent market-garden crops are grown unless these crops are fenced in.



FIG. 86—Poultry in the Asparagus Field.

Among the fruits mentioned fowls will destroy all kinds of insects, will more or less cultivate the ground, and add much to the fertility of the soil. If the colony houses are placed on open land and are frequently moved, as they should be, areas sufficiently large for cultivation would soon be covered, and very large crops of vegetables or fruits could be grown on this in rotation. If the colony houses are large they should be built on shoes or skids, so as to be moved with horses. In locations at some distance from the main building a sharp

watch must be kept for hawks, crows, owls, skunks, weasels and stray cats, to see that the chickens are not taken during the day and have a safe place at night.

Production of Eggs.

For the production of eggs even more care is required than for the production of poultry. In preparing the pullets for laying the cockerels should be removed from the pens except one to each twelve to fifteen pullets. If possible give them full range and feed a variety of grains, scraps, and fresh bone, with an abundance of grit, oyster shells, and charcoal where they can readily get at it. Light, dry and airy quarters must be provided and kept scrupulously clean. If the pullets are kept in close quarters fresh green feed of some kind, grass, weeds, cabbage, or other wastes from the garden must be supplied, and some kind of litter on the floor in which whole grains may be scattered.

As with the production of poultry, the practice of feeding the dry or wet mash varies, with perhaps the advantage in favor of the former. The dry mash is made by mixing ground oats, cornmeal, shorts, gluten meal, and scraps in equal quantities and placing this mixture in slatted troughs or feeders where the fowls can get at it at all times.

The wet mash is made of more or less of the above grains often using boiled potatoes, beets, carrots, etc., with the mixture. As far as careful comparison of the two methods has been made, the dry mash has given the best results especially in houses inclined to be moist, and the labor is greatly reduced. The time of feeding the wet mash varies, too, with many, the most general practice being to feed hot mash in the morning. But the results of some careful experiments made by experiment stations indicate that the fowls assimilate

more of the food when the hot mash is fed just before they go upon the roost at night. Scraps, if not fed in the mash, should be given two or three times a week or be kept in slatted troughs all the time, as should be fresh cut bone and oyster shells. An abundance of fine gravel, or grit and charcoal should also be supplied.

Roosts.

Roosts should not be placed so high that the heavy birds will find it difficult to get upon them. If the roosts are placed high, there should be lower poles upon which such fowls can easily reach the higher. Round poles not over two and one-half inches in diameter are best, as the fowls can hold themselves firmly upon them. Insects are supposed not to thrive upon sassafras and sweet birch poles, and where these woods are available they should be used, but any kind of wood will do if frequently painted over with kerosene with a little linseed oil in it. The linseed oil does not evaporate but hardens upon the poles, and when it comes in contact with the insects destroys them and fills up the crevices in which they hide. In very cold houses curtained roosting places are often arranged. The curtains of burlap may be thrown up in the morning and dropped at night, or the fowls soon learn to go under them.

Nests.

Nests for laying hens should be in some secluded place, and are frequently located under the roosts. This, however, is not a good place unless great care is taken to clean out often and whitewash with a mixture containing kerosene. If a passageway is made through a house, outside the pens, and raised a foot or two above the level of the floor, nests may be located under the passageway floor and the eggs taken out through small

scuttles. When the nests are in some seclusion like the above the fowls are less liable to eat their eggs or break them by two or three hens getting into one nest.

BREEDS OF POULTRY.

The value of any breed depends much upon the care exercised in selecting the breeding stock. Thus a strain of barred Plymouth Rocks, Rhode Island Reds, or Wyandotts, may be built up, remarkable for their laying qualities; another for early maturity as broilers, while another may develop large size for poultry. So, too, by neglect a great laying strain may soon become poor layers or slow in maturing. No breed, perhaps, can combine all the desirable qualities, but it should be the aim of every grower to select for breeding those fowls that possess the most desirable qualities. In every flock there will be chickens that from the first are larger and more vigorous than others. These should be carefully removed and given especial attention, with the aim to produce large fowls. Selection of fowls for laying is more difficult, but if the flock is not too large we may select those that begin laying early, and by trap nests may determine the number of eggs laid by each one. When it is determined that certain fowls are more prolific layers than others, and of larger size, or more perfectly marked, they should be marked or separated so that when the breeding season comes on their eggs may be utilized.

The eggs of the different breeds as well as those of the same breed vary much in size and color, and attention should be given to this point, for one market prefers a white egg while in another the dark egg is in demand. If this process of selection is carried on skilfully for a few years pedigree stock of high character will be the result. The breeds most in use in Eastern United

States are Plymouth Rocks, Wyandotts, Rhode Island Reds, and Leghorns. The first are a good all-purpose fowl, being good layers, maturing early, making good broilers, and when mature dressing to weigh from five to ten pounds. The Wyandotts and Rhode Island Reds are of nearly the same size as the Plymouth Rocks, and may be equal to the latter as layers, broilers or poultry, but perhaps not quite so well fixed



FIG. 87—A Pigeon Loft.

in character. As egg producers the Leghorns and Rhode Island Reds seem to have the best reputation. The Leghorns, however, are small and perhaps not quite as hardy. White fowls—White Wyandotts, White Plymouth Rocks, White Leghorns, etc., are very popular, but possess no peculiar merits above other breeds.

PIGEONS.

A branch of the poultry business that has come into prominence within a few years is pigeon or squab rais-

ing. Our domestic pigeon breeds very rapidly and from a single pair one may in a year or two produce a large flock. They occupy but a small space, being generally kept in lofts (Fig. 87) or other out-of-the-way places, or in small houses like the colony houses for hens, with a flying yard attached. Close attention must be given them during their nesting season, their quarters must be kept neat and clean, fresh food and water must be supplied. The young birds are killed for market about the time they begin to fly and are sold undressed, bringing from 25 to 50 cents per pair while fancy birds for breeding purposes sometimes sell for as many dollars.

For further details as to poultry and its care the reader is referred to the Reports of the Department of Agriculture at Washington and those of the State Experiment Stations, notably those of Maine, Massachusetts, and Rhode Island.

CHAPTER XIII

DAIRYING, THE FAMILY HORSE, AND BEES

THE country home is incomplete without one or more cows. An abundance of milk and cream produced by one good cow will supply a large amount of the nourishment needed for the family, especially where there are children (as there should be in every country home), and the cost of keeping need be very slight if one has a little land for a garden and pasture, or upon which to grow fodder crops. The value of the product of a good cow will vary from \$50 to \$100 per year, and the cost of keeping, not counting the value of time in caring for her, need not be more than from \$30 to \$50 or \$20 to \$30 besides the grain purchased. (Fig. 88.)

When fed upon rich, well cured fodder, like clover, alfalfa, corn fodder, or well matured ensilage, and good pasturage in summer, cows will need but little grain, though a limited amount may be profitably fed.

For the best success the cow stable should be dry and airy, with an abundance of sunlight. For a single cow a box stall will be more comfortable, but it will require more labor to keep it clean than if the animal was tied to a stanchion. Some sort of a rack should be arranged to keep the hay from being trampled under foot, but the bottom of the crib should be on a level with the platform upon which the cow stands so as to be easily cleaned out. Cows may be kept in pasture from about May 10 to October 15, and south much longer. Where

the area of pasture is small, tying to a bar or tethering-pole will be found economical.

When feed is short in the pasture, cornstalks, cabbage leaves, small squashes, small potatoes, apples, and other wastes from the garden will help out the food supply, or small patches of oats and rye, fodder corn, peas and barley, etc., may be sown at intervals of a week or two up to August 1. The grain ration required to supplement the fodder must vary with the quality of this food. For the production of milk a mixture of



FIG. 88—The Family Cow. Even the Children can care for it.

equal parts of shorts, gluten meal and a little cornmeal or cottonseed makes a good feed, using from one to five pounds per day according to the richness of the fodder used. Fresh, clean and pure water is as important for the animals on the farm as for the family in the house who consume their products.

Milking.

With a gentle cow that milks easily any member of the family may do the milking. Even the children from ten to fifteen years old may do much of this work. The process is very simple but requires considerable strength of the hand and wrist.

Before milking the udder and sides of the cow should be brushed and wiped clean and if very much soiled be washed and wiped dry, so that no dirt may fall into the pail.

The pail is held between the knees, one front and the opposite rear teat being grasped by the right and left hand respectively. The thumb and forefinger are closed so that the milk in the teat cannot flow back into the bag, and the milk is forced out by the three lower fingers. A firm, even pressure must be given and the milk drawn out as rapidly as possible, the last drop being secured if it can be done without spending too much time in stripping.

Keeping the Milk.

As soon as drawn the milk should be removed from the stable, carefully strained through the fine strainer of the pail and two or three thicknesses of strainer cloth or cottonwool to remove all particles of foreign matter that may have fallen in during the milking. After straining, the milk should be cooled of the animal heat as quickly as possible in open pans in a refrigerator, in deep cans in a tank of ice, or in cans suspended in a cold well.

Breeds.

For ordinary family use or dairy purposes it matters little what breed is kept, as good and profitable animals may be found among all breeds. Those most largely in use for the production of cream and butter are the Jerseys and Guernseys, while for a large supply of milk the Holstein and Ayrshires are much in favor.

As with poultry, the value of any breed for special products depends much upon the strain, but perhaps in a lesser degree, for the good qualities are not so quickly and certainly transmitted and controlled. Thorough-

bred stock is much sought by the milk and butter producer, and while the average registered stock is generally better than that unregistered there are many noted animals that are not even "grades" unless a long distance away from that which is registered.

DAIRYING.

Where one has large areas of land in pasture and suitable for the production of fodder crops, and suitable buildings, the production of cream and milk for creameries or local or city markets may be profitably carried on. As with the single cow, one must have light, warm and well-aired buildings, with adequate space for storing the needed fodder, and grain, and a receptacle for the manure where the gases cannot rise into the space occupied by the cows.

A cellar opening on one side on the level with the surrounding land, well drained and with windows on at least two opposite sides, is all right for the manure if an abundance of absorbents is used, the windows kept open except in extremely cold weather, and the cellar cleaned out at least twice each year. A better arrangement, however, is where the cattle are kept in a shed separate from the main barn where the fodder is kept, and where the manure can be carried outside and dumped upon a cemented platform, to be carried to the fields before a large amount accumulates. If possible the foundation gutters, platforms, cribs, etc., should be of concrete, so that they may be cleaned and washed frequently with the least possible labor.

At the present high price of grain there can be but little if any profit in making milk at contractor's prices unless one can grow cheaply the necessary fodder and at least a part of the grain. The hay crop is very expensive and a cheaper fodder is found in the corn crop put

into the silo. By planting this crop in rich, warm soil early in the season, the ears of even some late varieties will mature and if cut up when the kernels are well glazed, and put into the silo, a rich food is produced that is much better than the ordinary green fodder that is generally put into the silos and requires but little grain to supplement it. Matured corn may be grown upon good corn land, at a considerable profit, if the work is done cheaply with the corn-planter, weeder, and cultivator. At least \$10 to \$15 per acre net profit may be realized after paying all cost of labor, fertilizers, seed, etc., and our Eastern farmers should grow more of the grain they consume and thus keep their money at home. "A penny saved in this way is twice earned."

The Tie-up.

There are many kinds of tie-up for cows and each has its ardent supporters. The chain tie sliding up and down upon a stanchion post is perhaps most generally in use. It is inexpensive and allows much freedom to the animal, but each dairyman should adopt the one best suited to his stable.

The Milk Supply.

One of the great problems in producing milk for large contractors or for the milk-route, is to keep up a regular supply during the changing seasons of the year. Thus, for the family supply two cows must be kept, one to come in in the fall and another to give milk while this one is dry. Or one must sell when the milk supply becomes short and buy a fresh one. With large dairies frequent changes must be made, or surplus cows be kept, to maintain this supply. There are always good cows to be found in the market and one who is skilled in the points of a good cow may keep up the supply by

buying and selling, but it will be safer for the amateur to keep good cows over, having several surplus ones on hand, and raise the young females of those which have proved the most valuable.

Keeping Up the Standard.

The modern milk market demands milk of a certain standard as to quality, solids, and freedom from bacteria, unpleasant taste, and odors.

The percentage of solids in milk of different animals varies much, and it is conceded that this percentage cannot be materially changed by the food given; therefore if one is making milk below the standard he must add to his herd cows that produce a higher standard of milk. This necessitates the testing of the milk of all of the members of a herd in order to know which are giving poor milk, which is done at little or no expense by the experiment stations and most of the milk contractors.

Standard of Purity.

The boards of health of States and large cities are demanding milk for the people free from unhealthful or undesirable foreign matter—*i.e.*, free from foul odors, and the various bacteria or germs of disease and decay. To secure this careful inspection is made by the boards of health and by the contractors, thus necessitating greater cleanliness and care on the part of the dairyman in the production and care of his milk.

The greatest profit is made by milk producers who peddle their milk in villages and small cities, by which means they get the full retail price. Milk is sold to the large contractors for from four cents to five cents per quart, while the retailer gets from his customers six cents to eight cents per quart, thus realizing from two cents to four cents for the labor of delivering. One

great advantage of retailing in this way to one also engaged in growing vegetables and fruit, is that these products may also be sold on the same route.

Raising Calves.

For the past quarter of a century raising calves has been on the decline in many dairying sections, this being more largely done in districts outside the milk producing limits and the cows shipped to dairying places. With the increasing prices of all dairy products there should be some profit in raising the female calves of our best cows, even by the milk producer, and at the same time our herds would be greatly improved thereby.

The labor of rearing calves by hand, as must largely be done with the present price of whole milk, is considerable, but the cost of feed for the first two years is comparatively small and a good two- or three-year-old will often sell for from \$30 to \$50, according to her promise. This work should be done for the pleasure of it, as well as for the profit. The young members of the family will take great interest in the "Bossies," and may help in the feeding, and the calves soon become great pets and playmates when properly handled. By careful selection of the stock from which "Bossy" comes a higher standard will soon be established, and many a fine herd has been built up from a single high-grade animal. When one can obtain skim milk, this with the addition of a little well-cooked "fancy middlings," or linseed meal, will make a good food for several months. If skim milk is not obtainable, a porridge made of the above meals or some of the calf foods will keep the calves in good growing condition.

If reared during the winter they are ready to go to pasture in the spring, when they will require little or no care for about six months.

During the first winter after coming from pasture they should be fed fine, tender hay, rowen, or clover much of the time, with now and then a feed of carrots, apples, or small potatoes. Well ripened and thoroughly cured ensilage also makes a good fodder for yearlings as well as for older animals.

One of the great advantages of the dairy business in connection with other branches of the home farm, is that a regular monthly income is received and one does not have to wait until the end of the season for money with which to pay bills as they come along.

Selecting the Family Cow.

The man who knows the "points" of a good cow can go into the market and buy animals that will be what is desired, but the inexperienced buyer must depend upon the judgment of others. Some farmer friends or some reputable dealer or successful dairyman should be consulted. The first and last will advise honestly, and the second will often for a consideration find for you an animal that will be what you want.

THE FAMILY HORSE.

Motorcycles, automobiles, and trolley cars have become common in almost every village and hamlet, and one may go to almost any section of the country with one of these, yet the family horse is not a thing of the past and prices have been going higher and higher for these for many years. No inanimate machine, no matter how perfect its achievements, can take the place of that family pet that so faithfully and intelligently takes us about for business or pleasure. A good, well-trained horse soon becomes almost a member of the family, and even women and children may safely feed, groom and harness it. (Fig. 89.)

The Stable.

The horse should have warm, rather light and well-ventilated quarters. Where room is abundant a box stall is much better than the narrow tie-up stall. The family horse unless regularly fed and worked is liable to many diseases, caused often by improper food or over feeding. The horse's stomach is small and it should be given small quantities of food at more frequent intervals than the cow, which has a large stomach



FIG. 89—The Family Horse. One That Has Done Service for Twenty-Six Years, and is Good for Many More.

and can draw up the partially masticated food—her cud—and chew it over at her leisure. Very bulky food in large quantities should be avoided, though a feed now and then of meadow hay or corn stover may be beneficial.

During the summer an occasional feed of green grass or a run in the pasture now and then will do the horse much good, and during the winter a few feeds of clover hay, or carrots will improve his digestion. For horses that are working but little, grain will not be needed except after having been driven, and then a few oats

will be the best feed. For working horses two parts of oats to one of cracked or whole corn make a good grain ration, giving them from one quart to six or eight quarts, according to size and the amount of work done.

Timothy hay is generally considered the best "horse hay," but a clean bright mixture of several of the so-called English grasses with a sprinkling of clover in it may be equally good.

Watering.

Horses should be watered two or three times each day but never immediately after a feed of grain, as owing to the small size of the stomach the grain would be washed out before it was digested.

CARRIAGES AND HARNESSSES.

Carriages and harnesses are expensive additions to the home equipment, but with good care may last a long time. Varnished carriages should be kept where the gases from the manure-pit cannot arise and disfigure them. They should be kept clean by frequent washing and wiping with chamois leather; frequent examinations should be made, and any nuts or bolts that may have become loose should be tightened.

Harnesses should be kept in a dry place, be cleaned frequently, and wiped over with harness soap. The leather should not be saturated with oil, as this causes decay, but after washing and before fully dry a dressing of oil should be applied. As with our own clothing, a stitch in time in the harness often saves nine or more and also a broken harness and perhaps a serious accident. In a warm stable a thin blanket will be found economical in keeping the horse clean, and in a cold stable a thick one is needed for warmth. By the use of building paper, however, and a few laths any stable

may be made warm, and it will be found cheaper to use the paper than to supply food to keep the animal heat up to a comfortable point.

BEES.

There is no more interesting living thing than the honeybee. It is possessed of wonderful intelligence and skill, producing large quantities of honey with little or no expense to the owner, and at the same time aiding



FIG. 90—A Modern Apiary. Note the Terraces and Open Ditches to Ensure Perfect Drainage; also the Shelter of Grove in Background.

in the more perfect fertilization of the flowers of all our fruit and ornamental trees and plants. As much as one hundred and sixty pounds of choice honey has been produced by one colony of bees in a single season.

Bees occupy but a small space and require no expensive house to live in. In most large apiaries the hives are placed in the open and only a few inches from the ground (Fig. 90). Here the bees that come in laden with honey or pollen if they fail to alight on the board in front of the hive can crawl up and reach the hive and deposit their load. The ground, too, is warmer than the

air, and the hives are not as much exposed to winds as if on a higher stand. Small apiaries are often placed upon a stand two or three feet high, with a roof over it and where shelter and protection may be afforded during the winter without taking them into the cellar. Successful apiaries have been located upon the flat roofs of city houses, the bees flying several miles in search of honey.

The Hives.

The old "box" hive is a thing of the past, having been superseded by those with movable frames to which the bees attach their combs, and which can be removed at pleasure for examination or rearrangement.

Upon these frames is often placed "foundation"—thin sheets of wax—upon which the bees build their combs, this serving as a guide to enable them to put the combs straight and true on each frame.

There are as many patent hives as of churns and washing machines, many of which possess features of merit, but the more simple the construction the better, and one skilled in the use of carpenter's tools can make for a small cost hives that are practically as good as many that are sold at high prices.

Surplus Honey.

The modern method of putting up surplus honey for market is by having small boxes or sections holding just one pound placed upon the top of the hive in such a manner that the bees will fill it in regular and even sheets. When quickly made the comb is very white, and all sections should be taken off as soon as the cells are capped over. The best honey is made from apple blossoms, white clover, basswood, and buckwheat, grading about in the order given. That from other and mixed flowers is of poorer quality. The buckwheat is dark and

does not bring as high prices as the light and delicate honey made from the first three flowers above mentioned.

Swarming.

One of the greatest trials of the beekeeper comes in May, June and July, when the bees are liable to "swarm." If left to themselves along in the early summer, the number of bees becoming too great for the hive, a large body of them with the queen will start out in the middle of some bright day to seek a new home. Before locating permanently they generally cluster on some bush or tree nearby while scouts are sent out in search of a new location. If taken at this time and put into a new hive they at once go to work, and if early in the season, before the supply of honey becomes short, they will make a strong colony. This natural swarming is a very uncertain operation, and necessitates constant watching, as often swarms will come out when no one is near to hive them, and they disappear and are lost. Swarming is delayed and sometimes prevented by putting on extra sections when the bees seem to be idle, but the most certain method is by artificial swarming. This consists in first driving nearly all of the bees into a hive placed upon the one to be divided. Two or three frames containing young brood are placed in the centre of the new hive, which is then placed upon a new stand, two empty frames being put in the old hive. The new colony will soon fill the empty frames and rear a queen from the young brood of the two frames given them and both will become strong colonies.

The details of caring for bees at all seasons can only be learned by closely watching them and studying some of the recent and up-to-date books on the subject like "A. B. C. of Bee Culture," and by visiting some good apiary.

CHAPTER XIV

MONTHLY CALENDAR

IN this chapter are given suggestions and hints that may call to the mind of the busy home owner some of the work that ought to be done and the time for doing it, the detailed directions for the doing of which will be found in previous chapters of this book. These suggestions are given under headings which will enable the reader to find the desired suggestions without searching over all of each month's calendar. They are especially adapted to New England, and to make them apply to more southern sections select those of two or three months ahead, while for the more northerly select those one or two months later.

JANUARY.

The Land.—When the land is covered with snow or frozen hard, manure may be drawn upon runners or wheels better than later when the weather may be more favorable for other work. This manure, however, should not be spread upon the surface if the land is very sloping, as much of the liquid would be washed down hill during heavy rains or thaws. This month is the time to make plans for the coming year. It is the school time, when we may stop and take a breath and learn from books, agricultural papers, farmers' institutes, etc., what others are doing, the best methods of growing our crops, desirable varieties, the best markets and methods of marketing, etc. Seedsmen's and nurserymen's catalogues should be studied and orders put

in for the seeds, fruit trees, and plants needed for the farm or garden. A definite plan for the treatment of each piece of land should be made.

Buildings.—All buildings should be carefully inspected as to changes or repairs that are needed, as during the leisure time of this month and next much of this work may be done, or material be gotten out for future use. Painting may be done on the mild days in winter. Oil and paint, being a little thicker at this time, will harden more on the surface and not penetrate the wood as much



FIG. 91—After School and Before Chores. January.

as in warm, dry weather, though it will not spread as easily. Thermometers should be kept in all stables, and vegetable and fruit cellars, to enable us to know what the temperature is before injury is done.

Stock.—See that the stable is warm and free from cold drafts upon the animals, yet well ventilated. Don't overfeed the horses that stand in the stalls most of the time. Regular feed and water is of the utmost importance. Sheep and Shetland ponies are so thoroughly protected by their coats of wool and hair that they thrive best if allowed to stay in the open air most of the time, but must have a dry place to stay in during stormy

weather. Give the pigs a dry place and an abundance of bedding.

Roads and Walks.—Little can be done upon roads and walks at the North, but repairs and the making of new ones may be done further south.

The Lawn.—If uncovered, the lawn should be dressed with a little fine stable manure, to protect the grass roots. Coarse, green manure is unsightly and offensive and has no advantage over that which is fine and partially decomposed.

Trees and Shrubs.—Ornamental trees and shrubs may be pruned during the winter if one has the leisure, except sugar maples, butternuts, and birches, which will flow sap from the wounds as the weather of spring comes on. These should not be pruned until the buds are well swollen in the spring. Order for any ornamentals that are to be planted in the spring should be sent in now, that a good selection may be obtained. The first orders in are often filled with the best specimens.

The Flower Garden.—The making of plans and sending in orders for seeds and plants is about all that can be done at this time of the year. Materials for stakes, labels, etc., may be made ready for spring use.

Greenhouses and Sash.—If one has a greenhouse now is the time when it should have the most careful attention. Be sure that all parts of the furnace are in good order, as a break or leak at this time may mean the loss of all in the house. Replace broken or cracked glass at once. Hot-bed sash should be looked over and all broken glass replaced and the sash bars be drawn with rather thick paint. This is often as effective in keeping out the water and holding the glass in place as using putty on the outside.

The Orchard.—If pruning of fruit trees is started this month and continued on warm days it may all

be completed before the rush of work in the spring. Pruning, especially on large trees, is slow work, and should be begun as early as possible. Prune from the



FIG. 92.—Pruning from the Top Down. The work may be done at any time after the leaves fall up to the opening of the flower buds.

top down, as in Fig. 92, and not from the trunk up as in Fig. 51, Chap. VII.

The Vineyard.—Grapevines should be pruned during the winter but not while frozen.

Small Fruits.—Little work can be done with small fruit plantations. Currant bushes may be pruned on

warm days and should the covering be blown from the strawberry bed it may be replaced. If this is done just before a snow or rain storm it will lie in place better than if put on in fair weather.

Tools.—Every tool large and small on the place should be looked over and repaired and put into order for work. To prevent the iron and steel parts from rusting, wipe over with kerosene and linseed oil and paint the woodwork with linseed-oil paint. If a special color is selected, one's tools may be readily recognized when borrowed by neighbors who fail to return them. By this care tools may be made to last a lifetime

Fertilizers.—Study the bulletins of the fertilizer inspectors of the experiment stations, to decide what are the best, and order such as are needed that they may be ready on the ground when spring work begins.

Seeds.—Nurserymen's and seedsmen's catalogues should be coming along about this time and should be looked over to see what new things are offered. Novelties should be tested only in a small way, as nine-tenths of these have not proved more valuable than the old standard sorts.

Poultry.—Keep the poultry warm but give plenty of air. Dryness, an abundance and variety of feed—not too much—with exercise, is the secret of the production of eggs in winter.

Bees.—Look at the bees occasionally to see that the opening into the hives is not stopped up by ice and snow. Bees are often smothered after an ice or sleet storm. A packing of building paper around three sides of the hive or a box set over it will help keep them warm and save their supply of honey for use later in the winter, when it may be more needed. Hives and material for sections, etc., should be looked over and put in order for next summer.

FEBRUARY.

Land.—Continue the work suggested for last month. Winter should be the school time for those who live in the country and work on the land, and every spare moment should be utilized in learning what others are doing in our line of work, by reading the papers and bulletins of experiment stations and the Department of Agriculture, all of which may be had for the asking. When possible, one should visit neighboring farmers who are successful in the same line of work, attend farmers' meetings, and exchange ideas as to the best methods, best varieties, markets, etc.

Every piece of land we own should be studied carefully and full plans made of what we will do with it the coming year. In no other way can we expect to reach the best success in our business.

Buildings.—Work of repairs or improvements on buildings should be pushed so that we may have our time free for the active business on the land when spring opens. Watch the cellars, that frost does not get into them. A lantern or small stove will often keep out the frost, or extra banking of hay outside may be put on.

Stock.—Keep the cows and horses in good condition by an occasional change of feed, giving them a little exercise in the yard or fields when the weather will permit. Unless working, horses should be fed lightly.

Roads and Walks.—Gravel may still be put on the roads and walks, if the ground is uncovered. If heavy snows come upon the roadways, see that the shrubs and small trees are not broken down when it is shoveled out. See that evergreens are not broken down by the weight of snow.

The Lawn.—Unless conditions change decidedly from

last month, little or nothing can be done on the lawn. At the South, work of making new ones, reseeding old ones, etc., may go on as it would further north in March and April.

Trees and Shrubs.—Few of us do all the pruning that our ornamental trees on the lawn or by the roadside need, and we therefore should keep the saws sharp and on mild days do what we can to improve them. Every



FIG. 93—Making Quick Work at the Wood-Pile. February.

large cut made should be covered with thick linseed-oil paint to protect it from decay.

The Wood-Pile.—Most people in the country depend upon wood with which to keep warm, and getting up the wood-pile is a very important part of the winter's work. In cutting wood the improvement of the wood lot should be kept in mind. By skill and good judgment one may cut out the trees that are worthless for lumber, thin out where they are too thick, obtaining all the wood

needed, and that which remains will grow all the better. Old apple trees that have badly decayed trunks or are of the cider-apple variety make the best of fire-wood and should be cut down. They are only breeders of insects, and the other varieties would be much improved by destroying them. The greatest fuel value is obtained from wood that is cut and split while green, allowed to dry a little while, and then put into a dry, open shed to season. Hickory, oak, maple, chestnut, and pine are valuable in the order given. A gasoline engine or even horse power will help make quick work of the wood-pile. (Fig. 93.)

Lumber.—If there are large trees in the wood lot and a saw-mill in the vicinity, it will be economy at the present high price of lumber to have some of them cut for lumber for repairs or new buildings. A few boards and some dimension stuff for sills, studs, etc., will always find a use about the country home.

The Flower Garden.—Little can be done here this month. Study the catalogues, make plans, and order what seeds and plants are desired.

Greenhouses and Sash.—The work of raising plants for outside growth is going on in the Middle States and will begin in earnest at the North the last of the month. Many flower seeds like verbenas, pansies, Drummond phloxes, etc., may be sown under glass for early out-door blooming.

Orchard.—As with the ornamentals, pruning in the orchards should be pushed. The old worthless apple trees in the pastures and by the roadsides should be cut down and put into the wood-pile. Keep in mind that *pruning from the top* forces growth near the ground where the fruit can be easily gathered and where spraying can be cheaply done, while pruning from the trunk up forces growth to the tops of the trees where fruit can-

not be easily reached nor the necessary spraying done, and tends to an early decay of the trunks and lower branches. (See Fig. 51, page 148.)

If new trees are to be planted, orders should be sent in early and all plans as to distance and arrangement be completed.

Vineyard.—The pruning of vines in the vineyard and on buildings and garden trellises should not be delayed or the flowing of sap when the buds begin to swell will injure them. See method of training in Chapter IX.

Small Fruits.—Pruning of the raspberry and blackberry canes may be done now, though some growers delay this work until the buds begin to start that only dead wood may be cut out. The old and very small canes should be first cut out and then the new uninjured canes headed back about one-fourth of their length.

Vegetable Garden.—Little outside work can be done at the North during this month, except getting out manure, securing supplies of fertilizers, seeds, etc., but at the South out-door work is going on rapidly. Everything that will relieve the rush when the weather will permit of out-door work should be done. At the South early crops of peas, lettuce, beets, radishes, rhubarb, asparagus, etc., are now being harvested, while these crops are in stages of development less advanced as we go north until we find everything except such as are under glass still in the icy bonds of frost and snow.

Tools.—Keep at work upon the tools, and have every one put in the best possible condition. No one can do good work with poor tools, and it will often pay to buy new and improved ones, especially labor-saving implements like manure spreaders, weeders, wheel-hoes, seed and fertilizer drills, etc.

Fertilizers.—Clean up the poultry houses, pig pens, box stalls, manure sheds, etc., and take account of the

stock of manure and decide what will be needed for the crops to be grown. Don't spread over too large an area. We may often grow as much on an acre by intensive cultivation as is averaged on three or four acres, and the cost of cultivating the smaller area is very much reduced. Too many of us are "land poor."

Seeds.—Look over the stock of seeds on hand and if any appear to be poor test them in a plate of moist sand between two sheets of cheesecloth or blotting paper. If the percentage of germination is 50 or below, and that not strong, throw the seed away, as the plants coming from it will probably be weak. Don't be too late in ordering seeds for farm or garden; or exchanging with neighbors, if they have good strains, is good practice.

Poultry.—The hens should be laying heavily at this time and we should be planning for the best possible supply for setting next month. The hens should have a great variety of feed and be given a run in the open air during the middle of the day when the ground is uncovered. Every hen that wants to set should be removed to a room away from the other fowls and eggs be put under her. If a number can be set at once, at the proper time the eggs may be tested, the unfertile be thrown out and the fertile ones put together thirteen or fourteen to each hen, and those thus left without eggs be given a new lot. This also should be done with eggs in the incubator, and it is advisable to have two or three incubators filled at once, that none of them be run with a small number of eggs.

Brooders should be put in repair or new ones built so as to have them ready when the chickens are taken from the hens or incubators.

Bees.—On warm days bees will be flying more or less, cleaning out their hives, and should be watched to see

that no robbing is done. If there is any indication of robbing the opening in front of weak hives should be reduced so that but one bee can pass in or out at a time. This will enable weak swarms to protect themselves. If there is any question as to the supply of honey in the hives of any colonies, the hives should be examined, and if the supply is short the bees may be fed sugar and water.

MARCH.

The Land.—As we go north from Florida we shall find the land in various stages of cultivation. At the North only winter's work can be done, except in unusual seasons, when plowing may sometimes be done and seeds like onions, peas, etc., planted. The work suggested for the two previous months should be completed as soon as possible, that undivided attention may be given to planting when warm or suitable weather comes on.

Buildings.—As with all other winter work, all jobs upon or about the buildings should be rushed to the finish and every moment be given to it until it is completed.

The days are growing longer and warmer and more and more outside work can be done, but unless we have planned wisely we often find that we have "bitten off more than we can chew" and will have to leave some jobs unfinished or get behind with some of our other work. At the North foundations of out-buildings are likely to settle as the frost is working out, and there is no better time to repair this and put the foundation deeper while the ground is soft and before the building is injured. In the care of old buildings—and new as well—we should go on the theory that "a stitch in time saves nine."

Roads and Walks.—The best time to repair roads or

walks is when the frost is just working out of the ground. At this time the gravel will settle into the low wet places, and it soon becomes well compacted. Where there is a good road-bed only a narrow bed of gravel or broken stone should be put in the middle—not more than one-half of the width of the road-bed, as it will work out toward the edges from the travel over it.

Look out for the gutters and bars, as the soft soil or



FIG. 94—Sugar Orchard Scene in Vermont: Gathering the Sap. March.

road material is more easily washed at this time than at any other season of the year.

The Lawn.—Early in the spring is the best time to sow seed on the old lawn or make a new one. If manure was put on last fall, all of the coarse material should be raked off and some good lawn-grass seed be sown, raked in, and rolled. If there are many perennial weeds like dandelion, chickweed, speedwell, etc., in the lawn, they should be dug out before the raking and seeding. If there was a long growth on the lawn last fall it would

be best to rake off as much of it as possible on a very dry day, or when there can be no danger to buildings it may be burned off without injury. This old material, too, may be cut off with a very sharp lawn-mower and used as a mulch about the trees or put in the compost pile.

Trees and Shrubs.—After the ground will work up fine and mellow, the earlier trees and shrubs are planted, the better. If any pruning remains unfinished it should be attended to at once. Roses and other tender shrubs should be uncovered and the former be severely pruned. The best roses are produced upon strong new shoots that come from near the ground, and the flowers when gathered should be cut with long stems that strong buds may start out below the cut and produce a continued bloom. The covering about rhododendrons or other evergreen shrubs should not be removed too early, but may be thinned out and finally removed a week or two later. Shrubs that bloom early in the summer, like golden bell, spiræas, and Japanese quinces, should not be pruned until after flowering. The manure placed in piles about the trunks of trees and shrubs should be spread about under the branches and if on the lawn raked off later. When fertilizer is depended upon for the growth of trees or shrubs on the lawn, now is the time to put it on.

Spraying for the San José scale should be done before growth begins. The lime-and-sulphur scalicide and the scale destroyer have proved effectual in keeping this pest in check if not wholly destroying it, the former proving a good fungicide as well as insecticide.

The Flower Garden.—Transplanting of hardy herbaceous plants like peonies, iris, astilbe, phloxes, pinks, etc., may be done at this time of the year. If the plants are large they may be divided as shown in

Fig. 34, Chap. V, a single clump of peonies or iris making sometimes a dozen to twenty plants.

Seeds of hardy flowering plants, like alyssum, candy-tuft, hollyhocks, etc., may be sown as soon as the soil becomes fine and mellow. It is often the hot sun and drying surface of the soil that destroys germinating seeds, and they should be sown while the sun is low.

Greenhouses and Sash.—This is a critical time for plants in the greenhouse and under frames. During bright sunny days unless one watches the ventilators large quantities of plants may be destroyed in an hour or two. Summer conditions are produced at this time by furnaces and the increasing heat of the sun, and good judgment is required to keep up a healthful growth. Too much or too little water will cause serious injury as will too high or too low temperature, and insects increase at a wonderful rate. Plants should be run out into the frames as soon as possible, so that they may grow stocky and be well hardened off before planting permanently in the open ground. As the sun runs higher the glass should be shaded, first lightly with a very thin mixture of white lead and turpentine, which will give it a ground-glass appearance. Then later a more permanent shading may be made by adding a little more white lead and a little linseed oil.

The Orchard.—Transplanting is now in order as soon as the ground will work up fine and mellow, but trees should not be planted when the soil is sticky like mortar. See that the tops and roots are cut back as shown in Fig. 42.

The Vineyard.—All grapevines should have been pruned before this time and tied to their support on buildings, garden trellis, or vineyard wires. It is better, however, to prune now than to let it go undone. All trimmings should be cleared up and burned to destroy

any spores of disease there may be upon them. Spraying with a thick Bordeaux mixture or the lime-sulphur mixture will help the vines resist mildews, anthracnose, black-rot, and other diseases.

Small Fruits.—Raspberry canes may now be uncovered, straightened up from the ground, and pruned. Spraying as advised for the grapevine will be a decided benefit.

Tools.—See that every tool is cleaned and wiped dry after using. They should be hung up in a dry place. Keep the edges of hoes, spades, etc., sharp with the file or on the grindstone. A pound of effort in this way will save untold pounds of labor when we are using them among weeds and in digging where there are roots of trees and grass.

Fertilizers.—Quickly soluble fertilizers like nitrate of soda or sulphate of ammonia, should not be sown until about the time the plants begin to grow. Much better results will be obtained from all fertilizers if sown in close contact with the roots. For seeds it should be drilled in or finely mixed with the soil used in covering. For fruit trees, small fruits, etc., it should be spread close about them as far as the branches or leaves extend, and be cultivated or hoed in.

Seed Testing.—No risk should be run in planting untested seed. If the dealer will not guarantee the vitality of the seeds, a home-made tester may be made of two soup-plates, a little sand, and two sheets of blotting paper or cheesecloth large enough to cover the plates. The sand is put into the plate level full and made perfectly level by drawing a straight edge over it. It is then wet almost to saturation and one sheet of the blotting paper or cheesecloth spread over it. Then 10, 25, or 100 seeds are placed on the cloth or paper, the second cover is put on, and a little sand sprinkled over

it, and the second plate put on over all. This tester is then placed where the temperature is even, for cabbages, onions, beets, radishes, peas, etc., at about 50° to 60° during the day and 40° to 50° at night, and for corn, beans, cucumbers, melons, peppers, etc., 70° to 80° during the day and 60° to 70° at night. All seeds will germinate more certainly if the night temperature is about 10° to 15° lower than that of the day.

Poultry.—Early hatched chickens either from the hen or incubator will generally do better in brooders if they are properly made and the heat well regulated. Many kinds of brooders that work satisfactorily are on the market, or very serviceable ones may be made by any one skilled in the use of carpenter's tools. For heat a lamp must be used with a burner the blaze of which will not grow larger as the lamp and surrounding space become warmed, as many ordinary lamp-burners do.

Bees.—Continue to watch for robbing and see that each colony has honey enough, for as warm weather comes on and they are breeding rapidly they will consume a large amount and will be unable to collect much until next month at least. Let everything be cleaned up around the hives and stands, so that the bee moth may not find ready hiding-places.

APRIL.

The Land.—The work of this month at the North and February at the South are somewhat alike, except that at the South there has not been the frost and snow but continued spring for several months. At the South summer crops are being harvested, while at the North only spring planting is just begun. Seeds of radishes, onions, turnips, cabbages, celery, parsnips, beets, etc., may be sown out of doors on land that will work up fine and mellow. Mowings and meadows should be dressed

with fine stable manure or fertilizer before much growth begins, though nitrate of soda will give better results if sown a month later.

Greenhouses and Frames.—These are being crowded with plants from seeds and cuttings, which are moving in rapid succession from the greenhouse to the frames. All plants like cabbage, cauliflower, celery, geranium, verbenas and other bedding plants do better if hardened off in the frames.

Roads and Walks.—These should be fixed up as soon as the ground has settled. The farm road need not be of gravel, but when ruts are made if a little loam or turf is put into the ruts, some grass seed sown and then rolled with a heavy roller or dragged, it will soon become solid enough for all ordinary farm teaming, and be much neater and more easily kept in repair. Grass walks slightly crowning in the middle, the grass being kept cut close with a lawn-mower, make beautiful walks and are passable even in light shoes at all times except during storms and after heavy dews in the morning.

The Lawn.—When the grass has reached three or four inches in height the lawn-mower should be run over it, but it is best to let it get strong before clipping closely. Quickly soluble fertilizers or fine stable manure should be put on, with a liberal seeding of lawn grasses, all well raked in and rolled. If this is done just before a rain, the seed will be nicely covered and start at once into a vigorous growth.

Trees and Shrubs.—Transplanting may still be done, but the more advanced the season the more severely the tops must be cut back. If the soil be very dry water may be poured into the holes before the trees are set, or, after the roots are partially covered it may be put in to settle the soil about them. A small quantity of water used in this way will do more good than many

times the amount put on the surface after the hole is filled up. After planting in a dry time the surface soil should be kept light and mellow or mulch of hay or straw be used to keep in the moisture.

The Flower Garden.—Here, as in every other line of work in the farm and garden, every moment must be made the most of. The earlier transplanting of hardy plants is done, the better. The fight against weeds like witch grass, sorrel, etc., must be made early, and the weeds pulled out root and branch and taken to the compost pile. Annual weeds are best destroyed with a rake or light hoe as the seedlings are breaking through the ground. An hour's time at this stage of growth will accomplish more than a day when the weeds are large.

The Vegetable Garden.—All crops that grow at a low temperature should be planted outside this month or early the next. The asparagus bed should be cleaned up, the tops burned, and manure or fertilizer worked in. Rhubarb beds should be treated in the same way. If they were covered last fall with a heavy coating of manure the coarsest part should be removed and the finer spaded in. If the soil is heavy cover seeds lightly. A good rule for covering seeds is, under the average good condition of soil, to cover two or three times their thickness when the soil is well pressed upon them.

The Orchard.—If possible spray all fruit trees before the blossoms open. Use Paris green or arsenate of lead for all leaf-eating insects. Remove the webs of all tent caterpillars from fruit trees and the wild cherry while they are small.

If young trees are kept dormant they may be planted until the middle of May, but their chances for growing are much less than if planted earlier. Consult experiment station bulletins as to latest and best methods of combating insect and fungous pests.

Small Fruits.—New plantations of all small fruits, if not made last fall, should be done as early as possible, cutting the tops of raspberry and blackberry canes back to only a few inches above the surface of the ground after planting. Apply an abundance of manure or fertilizer about each plant before growth begins. Spray these and currant bushes with the Bordeaux mixture before the leaves unfold. The earlier strawberry plants are set in the spring, the better. Use only plants with white roots. Those with black roots are old plants.

Poultry.—Chickens should have constant attention. Regular feed in considerable variety will be needed for the best growth. If given the run of a pasture, a brush lot, asparagus field, or raspberry or blackberry plantation, they will develop rapidly. If they are kept in small pens or coops these should be moved frequently to keep up the supply of green food. If hens are kept in close pens, they should be let out a short time each day just before going to roost. All fowls more than one year old should be dressed for home use or market as they cease laying.

Bees.—This is a busy time with the bees. As warmer weather comes on they can gather pollen and a little honey, and if they still have some stores on hand they should be breeding rapidly. See that they are well supplied with honey for their increasing family.

MAY.

The Land.—Fit the land thoroughly for all kinds of crops. Harrowing, rolling or dragging an acre one or two times extra when one is at the job will add but little to the cost, while it may save much after labor and give a much larger crop. Stirring the soil, especially on bright, sunny days, helps to warm it up wonderfully.

Buildings.—See that the water from the eaves is carried away from the building quickly, for if sills are constantly saturated with moisture during warm weather they decay rapidly. Gutters should be arranged and the soil so graded that water will not run back upon the cellar walls if a dry and healthful cellar is desired.

Stock.—As soon as feed has become abundant, the cows and heifers should be turned out to pasture. This time ranges from the 1st to the 20th of the month, according to latitude. As warm weather comes on a feed now and then of carrots, small potatoes, or green grass, will do the horses good. Young calves that have been fed from the pail all winter should be tied out a short time each day before putting out to pasture.

Roads and Walks.—Weeds will soon start to grow in any material on roads and walks except coarse gravel or broken stone, and the surface of the old walks, if to be kept clean, should be hoed and raked over and a thin dressing of screened gravel or broken stone be put on. If grass roads and walks are to be kept up, levelling off here and there where ruts have been made, adding some new soil and lots of grass seed, will ensure a good growth of grass.

The Lawn.—The routine work of clipping is the principal need upon the lawn this month. The edges of walks, beds, and borders, must be frequently cut, as the grass spreads rapidly at this time of the year.

Trees and Shrubs.—Much may be done to improve the form of trees and shrubs by pinching or cutting off the ends of shoots that tend to grow beyond the outline desired. All sprouts from near the ground or along the trunks should be rubbed off as soon as discovered. No large branches should be cut at this time except from maples, butternuts, and birches, which were not trimmed in winter on account of bleeding. For cutting large

branches the saw only should be used, and never the axe.

The Flower Garden.—Here as everywhere else weeds will need attention and should be treated as recommended for those in the vegetable garden. As the flowering plants, like lilies, hollyhocks, etc., grow tall, they should be tied to neat stakes. If grass-walks have been made between the beds the lawn-mower should be run frequently and the edges cut often. The more closely



FIG. 95.—The Beginning of the Strawberry Crop. May.

the flowers like pansies, sweet peas, etc., are picked the longer they will continue to bloom.

The Vegetable Garden.—The close of this month will see the seeds of all kinds of vegetables sown—cucumbers, melons, and squashes, not until the last, while corn, beans, tomatoes, etc., are planted or set out earlier. Small lots of peas, sweet corn, radishes, lettuce, etc., should be planted at intervals of two weeks in succession for the summer home supply. This month we

should have an abundance of radishes, lettuce, asparagus, rhubarb, spinach, etc., from our own garden.

The Orchard.—Follow the suggestions for last month. After the petals have fallen, spray for the codling moth, canker worm, plum curculio, etc., using the Bordeaux mixture and Paris green or arsenate of lead.

Small Fruits.—One spraying with Bordeaux mixture and an arsenate is all that will be needed on the small fruits before the blossoms open. The currant and gooseberry bushes should have especial care just as the leaves unfold, to destroy the currant worm, that appears at this time. Frequent cultivation with the horse or hand wheel-cultivator is necessary for a rapid growth.

Poultry.—Close watch must be kept that chickens are not taken by crows, hawks, owls, skunks, etc. Keep their quarters clean and dry. As they increase in size they will require more room and should be put into the colony houses as soon as the weather permits. They will grow in proportion to the feed and care given.

Bees.—This month should be the best harvest time for the bees. The blossoms of apple and other flowering trees and shrubs are abundant during the early part of the month, and white clover comes on soon after. The best honey is made from apple blossoms and white clover. Keep all the bees at work in strong colonies by having plenty of sections on the top. This may prevent swarming. Artificial swarming may be done on warm days, taking frames of brood from strong hives and putting them into new hives with most of the old bees. If this division is carried on too far, it may be at the expense of a large surplus the first season, but we have two or more strong colonies in place of one, and perhaps would have lost one or more swarms, had they swarmed naturally.

JUNE.

The Land.—As in May the principal work upon the land is cultivating frequently to kill weeds, produce or develop plant food in the soil, and prevent the escape of moisture. By the last of the month the early crops of peas, lettuce, beets, etc., may be off the land, so that it may be plowed or spaded and manured for a second crop. Where there is a rye, clover or other green crop upon the land, it may be turned under and the land fitted for a crop of cabbages, cauliflowers, celery, late beets, turnips, etc. If a large dressing of stable manure was applied in the spring, commercial fertilizers may be used with profit for the second crop, especially those quickly soluble like nitrate of soda, acid phosphate, potash salts, etc. Bone, fish, and other organic manures are so slow in dissolving that they cannot be profitably used for these late crops.

Buildings.—Rain storms and gales are more frequent during the summer, and every precaution should be taken that doors and windows be so fastened as not to be blown down, and any damage caused in this way should be repaired at once. After continued dry weather leaks on the roofs, especially about chimneys, may be discovered with the first rain thereafter.

Roads and Walks.—Continue to follow suggestions for the previous months. Keep gutters and bars cleared so that in heavy showers the water will pass quickly from the surface and not cause bad washouts.

The Lawn.—The grasses grow rapidly this month if there is an abundance of rain, and the lawn-mower should be run frequently. It is better to cut frequently and let the clippings lie upon the ground than to cut less frequently, and have to rake the clippings and cart them away. If water is applied to the lawn, enough should

be used to wet down to the lower roots. A little water upon the surface does more harm than good, as it causes the roots to grow near the surface, and with continual drouth the plants are more injured than if none were used. A little nitrate of soda or quickly soluble lawn dressing will help to keep the lawn green. These should be sown just before a shower if possible.

Trees and Shrubs.—The elm beetle will appear in many localities, and spraying with arsenate of lead or Paris green is the surest remedy. If the Bordeaux mixture is used it will prevent injury of the leaves by the elm blight.

Newly planted trees must be watched. In times of drouth if they are found wilting a space should be dug nearly down to the roots, a few pailfuls of water put in, and the soil replaced. After this a mulch of hay or straw should be applied. If one has running water, enough should be applied to the surface to wet down to the roots. As upon the lawn, a little water will do more harm than good in a dry time.

A power spraying outfit and at least two good climbers besides the driver are needed to spray tall trees most economically. Spraying while the larva of the gypsy-moth, the brown-tail, is small is a more effectual remedy than any traps or parasites.

The Flower Garden.—As fast as the flowers fade the stalks should be removed unless it is desired to save the seeds, in which case they should be allowed to fully mature. Gather the seed stalks and pods that are ripe and keep them in sheets or in large paper bags after they have been dried. Be sure to label distinctly with name and date of gathering. Keep in a cool, dry place.

The Vegetable Garden.—Garden crops that require high temperature like beans, corn, cucumbers, squashes, and tomato and pepper plants, may still be planted and

the second crop of peas, beets, cabbages and cauliflowers, etc. The fight with weeds must still be kept up and the ground stirred to keep in the moisture.

The Orchard.—Continue to watch closely for insect pests. The San José scale will begin hatching young this month, which is easily killed by most of the well-known remedies before the hard scale is formed upon its body. Scalicide, scale destroyer, etc., must be used in a dilute form during the summer or it will injure the foliage.

Small Fruits.—The first fruit of the season, the strawberry, is gathered this month at the North. (Fig. 76.) For home use picking once in two days except in very hot, moist weather is all that is needed. The value of the crop depends much upon how it is picked and marketed. The fruit should be cooled off as soon as possible after picking, but not put upon ice unless it is to be shipped in refrigerator cars. Keep the ground moving among all of the bush fruits and the young strawberry plants.

Grapevines must have attention, tying up all canes that are to be grown for next year's fruiting, and pinching the ends of all the fruiting laterals at the last cluster of blossom buds. After this the ends of all new shoots must be pinched except the two or three new canes on the lower vines that are to be fruiting canes next year. Vines on buildings and garden trellises must be treated the same way, except that as many canes must be allowed to grow to their full length as are needed to cover the required space.

Poultry.—As the chickens grow older more space and care and feed will be required to keep them in a healthful condition. Give them an abundance of range for fresh green food and insects, either by moving the colony houses frequently or by changing their ranges.

The fowls that are now ceasing to lay had better be put upon the market, and the cockerels separated from the flock and fattened as fast as possible. At this time they should be bringing high prices and if well dressed will bring an income that will pay the large and increasing grain bills.

Bees.—Keep a sharp outlook of the bees and if they swarm put the swarm into a new hive and place it on a new stand at night. Keep all idle bees at work by adding sections to the hive for them to fill. Any section of honey well capped should be removed at once and new sections added, as the longer it remains on the hive the darker the comb becomes. The middle of the day is the best time to work among the bees, as all are busy gathering honey and do not have time to look after other people's affairs.

JULY.

The Land.—This is a good time after the hay is cut to turn over exhausted mowing land and reseed. The earlier this is done the better, but the seed had not best be put in until the land has been thoroughly aerated by frequent harrowing. August is nature's seeding time, and seed sown on land made thoroughly fine and mellow with the harrow, with 500 to 800 pounds of good grass fertilizer per acre, will pay a large profit upon the investment.

Roads and Walks.—A heavy dressing of salt or an application of some "herbicide" will kill weeds in the walks and roads. This is easier than hoeing them up, but more expensive, perhaps.

The Lawn.—The same care is needed on the lawn as last month. Annual weeds, finger grass, etc., will begin to grow in the bare spaces among the grass roots, and the best way to get rid of them is to cut the grass close. Sow more grass seed and apply fertilizer just before a

rain. A thin dressing of very fine rich manure after the seed is sown is better than lawn fertilizer.

Trees and Shrubs.—These will require little or no special care during this month, except to direct their growth as suggested in previous months. We should not allow any growth to continue that we must remove next winter or spring if we can avoid it. Removing the seed pods of lilacs, spiræas, etc., will cause them to grow more vigorously and mature larger and more abundant flower buds the next season.

The Flower Garden.—This month we should be enjoying the products of our labors in an abundance of flowers, but care should not be relaxed or we may be swamped with weeds, which grow almost in a day at this time of the year. Large plants like dahlias, cosmos, hollyhocks, gladiolus, etc., should be tied to neat stakes to prevent their being broken in heavy rain storms. Early maturing seeds should be gathered and put in paper bags or large envelopes.

The Vegetable Garden.—The planting of seeds for the season will end with this month. Seeds of late beets, lettuce, radishes, and turnips may still be sown, and cabbage, cauliflower, and celery plants may be set out in rich soil. Frequent stirring of the soil should be kept up. Seed stock of all kinds of vegetables should be selected before any of the crop has been harvested. By selecting seed from the earliest and best stalks of sweet corn, the best shaped summer squash, the smoothest, best shaped and most vigorous tomato plants, etc., our strain of these vegetables will be much improved. If several varieties of the above are planted in the same garden they will so mix as generally to be of little value. Sometimes, however, these crosses may be valuable; thus, if a yellow sweet corn like the Golden Bantam is crossed with a yellow of larger size, and the best of the

stalks and ears of this be saved for several years until its characteristics are well fixed, it may be of more value than either of the original varieties. New varieties, however, require several years of planting by



FIG. 96—Currants and Gooseberries Ripen in July.

themselves before their real value can be determined.

The Orchard.—In July we begin to gather some of the tree fruits. Cherries ripen from the middle of June to August, and must be picked as soon as ripe or they will decay. Birds are the greatest obstacle to cherry growing in the Eastern United States, and where one has but

a few trees they get them all. By covering with old fish nets or (if the trees are small) mosquito netting, some of them may be saved. In large orchards, the amount taken may not be missed and perhaps is no more than pays for the bugs and worms the birds destroy in other seasons of the year. Some of the very early apples will begin to ripen the last of the month, and all of the first droppings should be fed to the cows, horses, pigs, or poultry, to destroy the insects they contain. Pigs and poultry may be turned in among the trees, but cows and horses will badly injure trees with low heads. All trees heavily loaded with fruit as to endanger breaking down should be thinned out or propped up. It is often the case that if half of the fruit is removed from the plum, pear, peach, and even the apple tree, that which remains will be much larger and finer, will measure as much and bring higher prices than all would if unthinned. In this work of thinning all defective or wormy fruit should be picked off and destroyed, as it is worthless, only continues to breed insects, and takes the strength of the trees. With plums and peaches no two specimens of fruit should touch, and each fruit should have from three to six inches of space upon the branches.

Small Fruits.—Strawberries are through with fruiting along the Middle States and will last but a week or two in New England, but will be found more or less in our markets for a month, being brought from the North and East. As soon as the crop is off, unless the bed is to be carried along another year, which is not the best practice, the land with all the plants, mulch, and weeds should be turned under and fitted for a crop of cabbages, beets, celery, or turnips. To plow this well under without clogging at short intervals, a sharp wheel-coulter, which will cut through all this organic matter, should be used. If the land is free from weed seeds, it

can be very easily put into condition for seeding early in August and next season will yield a large crop of hay.

The new bed or field must be watched and weeds be kept out. If not growing satisfactorily scatter a little fertilizer along the rows and rake or cultivate it in. Runners should be placed where wanted or cut off if the plants are to be kept in hills. Raspberries and blackberries are fruiting and the soil should be stirred frequently among the rows to keep in the moisture, without which the berries will be small and few. All canes coming up between the hills or in the rows should be treated as weeds and be cut off or pulled up. If canes are falling on the ground with the weight of fruit or foliage, loosen the wires, place them over in the middle of the rows and then draw taut again, which will bring the canes up straight and close together. (Fig. 72.) The fruiting canes of grapevines should be girdled about July 1st to hasten ripening at the North; at the South this is not needed. For shipping grapes this is not desirable, as the skin is more tender and the berries more easily crushed.

Poultry.—At this time of the year poultry can be given a liberal supply of green food from the garden, or may obtain a large amount of this food from the pastures and fields, in the ranges among blackberry and raspberry bushes, or in the asparagus field. All cockerels except those to be saved for breeding should be marketed as soon as they are in good condition, and to this end should be separated from the pullets and fed fattening foods. There is much danger of neglecting the houses, roosts, and nests at this season of the year, yet even more care need be given, for during hot weather vermin grow more rapidly than during the winter. Whitewash the walls and roosts with lime and kerosene at least every month.

Bees.—This month little time need be given to the bees, except to see that all sections filled and capped be taken off as soon as filled and new ones put in their places.

AUGUST.

The Land.—Most of the land is now covered with farm or garden crops. If the grass land is dressed with fine stable manure after the hay has been cut, the mulch and plant food thus given will cause a rapid growth of new roots and shoots, and the crop for next year be greatly improved.

Weeds of all kinds, and especially hot-weather weeds like pusley, pigweed, etc., are growing rapidly and the only way to keep them subdued cheaply is by stirring the soil frequently. When they are small, light hoeing, raking, or using the fine-tooth cultivator, will destroy them, but when they become larger, the wing-toothed cultivator or small plow must be used to cover them up or they must be carried off the field.

This is the best month for seeding grass, but a fine and deep seed-bed and a rich surface soil are necessary for a strong growth of the grass seedlings.

Roads and Walks.—Little work need be done on roads and walks this month, other than was suggested for previous months. Keep the gutters clear so that there shall be no washing during hard showers. Tar-concrete gutters, walks, and crossings are best made during hot weather.

Trees and Shrubs.—These are about in midseason's growth, and many are maturing the terminal buds, so that no pruning is needed. Hedges which are pruned to keep them in a close, low form may now be pruned for the last time. The seeds of all kinds should be gathered when those first ripened are beginning to fall.

Those maturing early in the season like elm, red maple, etc., should have been sown at once and at the end of the season we will have seedlings several inches in height. Pine cones should be gathered at this time, put in burlap bags, and hung in a dry, airy place. They are the most quickly gathered by climbing into the trees and using long pruning hooks to cut them off. The seeds will fall out of the cones in the bags when dry. This seed is worth several dollars per pound. This is the best time in which to transplant evergreens unless it should be a very dry season. A moist day should be selected if possible. See that the soil is tramped about the roots very firmly. If very dry pour water into the holes.

The Flower Garden.—Bulbs that were not dug up in the spring and dried may be transplanted now, in the same ground or elsewhere. Make the soil rich and mellow. Gather all seeds as they mature and put in paper bags or envelopes distinctly labeled.

The Vegetable Garden.—The supply of fresh vegetables should be abundant at this time. All root vegetables become fibrous and woody, if allowed to stand long after maturing. Cabbages crack open; cauliflowers branch out; tomatoes decay, and should therefore be gathered and stored or sold. Cabbages and cauliflowers are especially forced into maturity by frequent stirring of the soil with the rake, hoe or cultivator, and may be retarded by loosening the roots a little. Sweet corn, and field corn for grain or fodder, should be cut up and stacked as soon as the kernels are glazed and before frost, if possible. Squashes must be gathered before frost and stored in a warm, airy place to cure, but the longer they remain on the vines the harder the shell, the drier the flesh, and the longer they will keep. Seeds of the common field turnips, and spinach, may still be planted at the North, for the winter's supply.

The Orchard.—Early varieties of apples and pears must now be harvested and sold at once, as they keep but a short time. Where the trees are low such varieties as Astrachan, Williams, Early Strawberry, Gravenstein, etc., are most satisfactory if allowed to drop on a mulch of hay, as they are not colored if picked before they are almost mellow. Pears should be picked as soon as fully grown and ripened in the box or barrel when shipped to market. The color is better if ripened in a close, warm place. Peaches and plums for local markets should ripen on the tree and not be picked until the green color of unripe fruit has changed to a yellow and the fruit is almost mellow. If any trees show signs of weakness with leaves yellow and small, look for San José scale, and spray as previously directed. Look also for borers and dig them out, or for the woolly aphis and spray as for the San José scale. Black knots on the plum trees should be cut off or painted with linseed-oil paint with a little kerosene in it. Cover crops of peas and barley will be beneficial if sown the first of the month and allowed to lie on the ground until next spring before turning under.

Small Fruits.—The principal work for this month is keeping down weeds among the raspberry and blackberry plants and currant bushes. Grapes are ripening the first of the month at the South and the last of this month and early September at the North. (Fig. 97.) This fruit must be ripened on the vines, and the longer it can hang the better the quality. It requires but a light frost to destroy the leaves, and if the frosts come before the fruit is ripened it can only be used for cooking. Vines in the garden or on buildings may be protected by covering, but no method of protection has been devised that is successful and profitable in vineyards.

Poultry.—Keep up the fattening and marketing of the chickens. They will soon “eat their heads off” if not kept growing and sold as soon as they are mature enough. Pullets and fowls should have all the run possible and be fed a variety of food, to cause early moulting, that they may begin laying before the holidays. Don’t let the hens and pullets out of the houses until the air is warmed up in the morning when there is frost.

Bees.—Watch the hives for moths, and robbing of the weak swarms, as the supply of honey decreases. Bees are like children, and even older persons; when idle they easily get into mischief.

SEPTEMBER.

The Land.—The last of August and the first of this month is nature’s seeding time. The seeds of grasses ripen the last of July and early in August and fall on the ground, and the rains cause them to germinate and get so deeply rooted as not to be thrown out by the freezing and thawing of the fall and spring. Weeds and brush should be cut along the walls and fences, and carried away, and not allowed to lie on the ground to smother out the grasses. If trimming is done along the roadside, the beautiful species of trees, shrubs and vines should be allowed to remain and only the weedy and undesirable be cut. When the surface of the roadside is rough and stony, shrubs and vines make a more beautiful covering than grass and weeds.

Buildings.—Plans should be made for repairs and improvements to buildings to put them into the best possible condition for winter. If they are leaky, look for loose shingles, cracks between shingles, etc., which show better in dry weather than after a rain. A slender spike on the end of a pole will enable one below to locate small holes so that one on the roof can see where new

shingles are needed. Any boards that have warped out of shape during the dry weather should be nailed in place before they come off and are broken.

Stock.—Plans should also be made as to where the



FIG. 97.—Harvesting the Grape Crop.
September.

stock will best be wintered. Box stalls for the young stock and possibly for the horses may be more desirable than tie-up stalls. Make doors and windows tight but so as to be easily opened and shut for ventilation.

Roads and Walks.—

Road material put on this month will be well trodden before winter sets in. On nicely kept lawns, flat or level road-beds on a level with or a trifle above the turf are better than if crowned, but where the material is poor crowning from six inches to a foot on a width of ten to twelve feet of road-bed will give the best results.

In repairing put the new material in the middle of the road-bed, over four to six feet of road-bed six inches deep in the center and running down to nothing on the edges.

The Lawn.—Keep the lawn closely clipped to prevent

annual weeds from producing seed. If not already done, get some fine manure or lawn dressing and grass seed on the surface as soon as possible. Cut and pull out all grass roots running into the flower beds. If new lawn is to be made use turf for the edges of walks, borders of beds, etc. This will enable us to work in the walks or beds when necessary without injuring the very young grass seedlings.

Trees and Shrubs.—Evergreens may still be transplanted with success if the weather is moist and the ground not dry. Greenhouses that have been resting and drying out should be started, watered, new soil and lots of manure put into the beds. Keep the houses open as long in the fall as possible to keep the plants healthy and stocky. Sow seeds of lettuce in beds outside.

The Flower Garden.—Planting of bulbs is now in order if they can be obtained. Many of the importations of Dutch bulbs come later than this month, but those taken from the beds last spring after blooming may be put in at any time. The richer the bed is made and the finer the soil the better will be the bloom next spring. Hardy herbaceous plants like peonies, iris, etc., may be transplanted as well as all kinds of bulbs. Make the beds very rich. Upon the lawn very pretty results are obtained by planting crocus bulbs in the grass. A hole an inch or two in diameter and four inches deep is made, the bulb is placed at the bottom and the hole filled with fine rich soil. These will bloom one or two years and then must be renewed.

The Vegetable Garden.—The tender vegetables must be harvested at the North before heavy frosts appear. The leaf stalks of celery plants must be drawn together and the soil packed about them to make them grow close and straight. Potatoes are generally better out of the ground after this month if one has a cool place in which

to store them; otherwise they will be better in the ground until cool weather comes on. If the pea and bean pods were not picked clean they may be pulled when ripe, dried, and later threshed out for winter use. These are just as nutritious for winter use as the small white beans and peas, though they may not look as well. Cultivation of the soil, while not as much needed as during July and August, must be kept up to kill the



FIG. 98—Sorting and Packing Apples. October. This work may be done as picked from the tree, or in the more leisure time later.

weeds and help the growth of late growing crops like cabbages, cauliflowers, etc.

The Orchard.—On orchards in cultivation this should cease unless the trees are weak. When in turf more mulch of old hay, straw, or weeds may be put on at any time if needed, but must not be close to the trunks as it will shelter mice.

Nearly all fall varieties of apples and pears are now ripening and must be marketed before they become

mellow. Keep the dropped fruit cleaned up and fed to the stock or chickens. Pick the pears when the wormy specimens are beginning to mellow but don't pick until fully grown. The largest may be picked first, when the small ones will grow faster and may be picked later. To ripen quickly after picking keep them in the dark at 60° to 70.° The lower the temperature the longer they will keep. The last of this month and early October is the best time for picking winter fruit; if fully grown and well colored, at the earlier date, or if not well colored, from the first to the middle of October.

If help is abundant and the weather good apples and pears should be picked and packed in the orchard, but with large crops this is not always possible and a part of the crop should be put into some cool, dry place like a north shed or barn floor (Fig. 98), where they may be packed in stormy weather. The sooner apples are sorted and packed and put into a cool place with even temperature, the better.

Small Fruits.—Little time need be spent in the care of small fruits this month unless one has leisure. The old canes may be cut out from the raspberry and blackberry plantations, grapevines may be pruned as soon as the leaves fall, trellises repaired, etc., but this work can as well be delayed until there is more leisure.

Poultry.—As cold weather comes on more care is needed with the pullets and laying hens. Keep them clean, warm and dry, give a variety of food and fresh water, and allow them to run on dry pleasant days as much as possible. Give them plenty of roost room. One cockerel should be allowed for each twelve to fifteen pullets.

Bees.—Few flowers will be in bloom this month and the bees must depend upon their stores for food. It is best to remove all surplus honey in supers, and if the

supply is short in the frames below let them fill them up from partially filled sections, or supers. Watch for robbers and protect weak swarms by closing the mouth of the hives.

OCTOBER.

The Land.—This month is a good time to top dress grass land, especially on hilly lots where the manure will have time to wash in before winter sets in and the fine particles to settle into spaces about the grass roots. The soil, too, is warm, which tends to a growth of the grass roots while the tops are kept dormant by the frosty air.

Late fall plowing on steep slopes is not advisable but upon level land will improve the texture of the soil and make it work up fine and mellow early in the spring. If a cover crop of peas and barley, oats, Japanese millet, etc., is upon the land it is best not to plow it under until spring as this cover prevents washing of the soil and keeps it light during the winter.

Buildings.—The cold frosty nights remind us that we must get ready for winter, and the stables, outbuildings, and poultry houses must be put into order before the severe cold weather.

The more permanent these improvements are made the better, yet all of these buildings can be made tidy and warm by a combination of building paper and laths or battens. Roofing materials may be put upon the outside and painted the color of the main buildings, and will present a very neat appearance. The green-houses should be looked over and all loose glass fastened in place. It pays to draw the sash bars on the outside with white lead and oil-paint every year.

Roads and Walks.—Suggestions made for last month apply equally well for this. New roads and walks and repairs on old ones can be made at any time.

Trees and Shrubs.—Many trees and shrubs can be more successfully transplanted this month than later this fall or next spring. At any time after the leaves begin to turn they may be transplanted.

Root formation is more rapid at this time, while the soil is warm, and the atmosphere cold. In exposed places delicate trees and shrubs like magnolias, tulip trees, Japanese maples, etc., should be protected after planting by setting up pine boughs on the north and west sides and somewhat in among the branches.

The Lawn.—The final mowing of the lawn may be made the last of the month, as it is not best to have a too heavy covering of old grass on the land over winter. After cutting, a light dressing of fine manure and grass seed will be all that is needed this fall.

The Flower Garden.—Beds from which annuals and other plants have been removed should have a good coating of manure spaded in, and the borders neatly cut, and will be in fine condition for next spring planting. Bulbs of hyacinths, tulips, crocuses, snowdrops, and even lilies may be planted, and irises, peonies, golden glow, poppies, etc., if these have not already been planted.

The Vegetable Garden.—Manure spaded or plowed under at this time will put the land in fine condition for early spring planting. Beets and carrots should be dug and put into the cellar before severe freezing weather. To keep root vegetables from wilting in a dry cellar pack in slightly moistened soil or sand or in moist leaves, which keeps them better and is cleaner and more easily handled. The greenhouses should be in full running order with carnations, violets, etc., and lettuce will be ready to transplant from the frames.

The Orchard.—All winter apples should be picked as soon as fully grown and well colored. This time

varies in different seasons with Baldwins, etc., from the 10th to 20th of October in Eastern United States. The longer they can be left on the trees without waste by dropping or injury by frost, the larger and better colored they will be. Late picking lessens the labor of picking and sorting, as most of the wormy fruit has fallen. Late varieties of pears like Anjou, Winter Nelis, Hovey, etc., should also be left on the trees as long as possible, but severe freezing will injure them. If there is a mulch of hay or straw about the trunks of young trees, see that it is drawn away, and fresh soil or coal ashes packed about them. Where there are a large number of trees painting with fresh limewash, and Paris green, will be the cheapest and best protection from mice and rabbits. Apple, pear and plum trees are better planted in the fall, if it can be done this month and the soil is not too wet and soggy.

Small Fruits.—Any weeds starting among the strawberry plants should be hoed or pulled and carried off the land, as at this time they grow almost as readily on top as in the soil. This applies especially to chickweed, witch grass, etc.

Raspberry, blackberry, and currant bushes can be more successfully planted in the fall than in the spring. By cutting the cane of the former down to about six inches, and placing a large forkful of manure over it, they will be protected and start very vigorously next spring. Cuttings of currants and grapevines will root more certainly if made early than later. Root cuttings of raspberries and blackberries should also be made this month and next.

Poultry.—Fowls should have completed moulting by this time and be ready for laying. An abundance and variety of feed is necessary for the best results, but fattening food should be avoided.

The "dry mash" system of feeding is very attractive, and should be given a trial. If successful it reduces the labor to the minimum. The best mixture perhaps has not been determined by practice for ordinary conditions, but probably equal quantities of shorts, gluten, linseed, ground oats, and corn meal and scraps always before the fowls should be given a trial, with whole corn, barley and buckwheat, to be scattered in the litter. Oyster shells, grit and green feed should also be before the fowls all the time.

Bees.—We must look after the supply of honey in the hives for winter's use, as little or no more will be gathered this fall. It is generally thought that there should be five or six frames well covered with bees and at least thirty pounds of honey at this time to enable a colony to go through the winter safely. The honey should be in such a position in the hive as to allow the bees to get at it in the coldest weather.

NOVEMBER.

The Land.—Work may be continued on the land as suggested for last month. Clearing up of all waste materials, burning the coarsest and composting the finer parts is always in order. Compost may be carted out and spread on level land, but on hilly land is best put in piles until spring.

Buildings.—Repairs of the quarters for the stock should be completed before extreme cold weather comes on.

Stock.—Young stock should be taken in from pasture from the first to the middle of the month. If the pasture is near by, they may be let out a short time in the middle of each day with advantage.

Trees and Shrubs.—Planting may continue during the early part of the month if the soil will work up fine and

mellow. Newly transplanted trees of large size should have supports of stakes or wire guys to keep the wind from swaying them back and forth and thus letting air down to the roots. Mounds of soil will help to support smaller trees. A mound of rich manure should be put about all ornamental trees and shrubs before the ground freezes.

Pine boughs should be set up about the rhododendrons and other broad-leaved evergreens or any other tender



FIG. 99—Raising Turkeys Almost a Lost Art. November.

trees and plants. Hemlock and spruce branches will not do for this, as the leaves soon drop off, but all species of pines, arbor-vitæ, and junipers hold their leaves. Oak branches that retain their leaves all winter may be used in the same manner.

The Lawn.—Keep the leaves raked from the lawn. If piled up in thick masses the grass roots under them are injured. They are worth much more than the cost of raking up for bedding, for litter, for poultry, and for

compost. They are very easily gathered by spreading out a large canvas or street horse blanket and raking them upon it. Then, taking hold of the four corners, a large quantity can be swung upon the shoulder and carried to the shed or stable.

Buildings.—Continue suggestion given last month until all buildings are snug and ready for winter. Look to the eave-troughs and gutters and keep them clear so that roof water may be carried quickly away. In using paper inside the poultry house cover the spaces between the rafters as well as the sides, and see that the ground for two or three feet away from the foundations is covered with hay or straw so that the frost cannot work through it under the floor.

The Flower Garden.—There are always a few last things to be done in the garden if the weather permits. Roses should be banked up with soil or manure and the tops tied up in loose straw. All rubbish should be gathered up and put into the compost heap or brush pile. Most of the tops, leaves, etc., that come from this cleaning up will in a year or so make good compost and it is a waste to burn it, when we would have only a few ashes of little value left.

The Vegetable Garden.—Everything in the vegetable line should be under cover by the middle of this month. Cabbages, kale, sprouts, and turnips will often stand longer without injury but it is unsafe to leave them much later than this. Celery, if left out longer than the 1st, should be banked to the top, covering nearly or quite all of the leaves after the middle of the month, but should be put into the pit or cellar on a cold, dry day. This crop in the home garden is often kept in the ground where grown until used. When the top of the ground has frozen an inch or so deep a light covering of hay is put over the whole bank, and when colder weather

comes on a little more is added, and so on until enough is on to prevent further freezing of the soil about the plants, when a few boards are put on to shed rain. When wanted, open one end of the row, take out what is needed for a week or so, and cover again. When skilfully done this method is very satisfactory, is easier than digging and storing in cellar or pit, and the celery is rather more crisp. Parsnips and salsify are improved by freezing, the starch in these roots being changed into sugar by the action of frost, and are often left out all winter. Such as are wanted for winter's use must be dug before the ground freezes, and to prevent wilting, which injuries them very much, they should be packed in sand or slightly moistened leaves.

The Orchard.—Little work will need be done in the orchard this month, though the planting of young trees may still be done during the early part of it. Pruning, too, may be done if one has the leisure, but all cuts made now must be more thoroughly covered with paint than if done the latter part of winter. Young trees not protected from mice should be painted with fresh limewash and Paris green. Don't use wash that has stood more than a few hours.

Small Fruits.—Planting of the bush fruits may still continue up to the middle of this month. The canes of tender varieties of raspberries should be laid down and the tips covered with enough soil to hold them close to the ground. Bend toward the south, so that the sun's rays will strike the canes at the ends and not broadside. Tender varieties of grapes like Roger's Hybrids, Iona, Niagara, Salem, Brighton, etc., will be benefited by laying on the ground and covering with a little soil. Cuttings may still be made and they may be planted or put into moist soil in a cold cellar until spring. The strawberry bed must be covered before

severe freezing. Pine needles, coarse strawy manure, hay, straw, corn stalks, etc., may be used. Forest leaves often compact so as to cause injury.

Poultry.—If egg producing is to be made profitable the fowls must be laying freely now while prices are at their highest. Keep stopping up the places where cold can get in but have as full ventilation as possible, without drafts. Have a store of green food, gravel and litter for use. Cabbages for the fowls may be stored on the north side of the houses and when freezing weather comes on leaves and straw thrown over them will enable one to get them out readily. Soft heads of cabbage may be bought at from \$1 to \$3 per load, according to size. Paint roosts with limewash and kerosene for nits, and have plenty of dust for the fowls to wallow in to keep down lice.

Bees.—Make all colonies snug for the winter. If there are only enough bees in a colony to cover five frames crowd those containing the most brood and honey together and put in a division board. If they have less than twenty-five pounds of honey, feed them enough sugar and water in the top of the hive to make up this amount. At the North the colonies should be kept in a dry, cool cellar, or have a box cover lined with hay put over them. Some only put a bag of hay in the super chamber.

DECEMBER.

The Land.—Work suggested for last month may still be done if the ground is not frozen. Manure may be drawn out even if the ground is covered with snow.

Buildings.—Continue to put the buildings in order for winter. If frost works into any of the cellars bank up with more hay or straw or use tarred, building, or roofing paper. The latter may be put on neatly against the underpinning either outside or inside. Have thermom-

eters in every place where frost would do harm and watch them closely. A pan of water on the cellar bottom is a good thermometer. This will freeze over when 32° is reached, and much before any vegetable or fruit crop will be injured.

Roads and Walks.—Finishing up the work suggested



FIG. 100.—A Christmas Tree Cut from the Top of a Norway Spruce to Force Growth Into the Lower Branches. December.

for last month is about all there is to be done. When snow covers the ground small stakes should be set up to mark the boundary of roads and walks, that the borders of lawns be not cut up by driving or walking over them.

Trees and Shrubs.

—These need but little attention this month if suggestions for the previous months have been carried out. Ornamental groves and wood lots may be

improved by thinning out surplus and poor material for fire-wood. With even unskilled help very good work may be done, the owner or some one of experience marking with blue chalk or crayon what and where to cut.

The Lawn.—Pick up, clean up all leaves, and put on a dressing of fine manure, if this has not already been done. Coarse green manure is offensive and unsightly

and if grass seed is used with the fine compost it will have a much better effect.

The Flower Garden.—Here, as with other parts of the home grounds, is a season of rest. Beds of bulbs that have not been covered, should have five or six inches of manure spread over the surface.

The Vegetable Garden.—Little can be done in the vegetable garden, but the stored products should have attention and if any are decaying or wilting the cause should be removed. Apples keep best at an even temperature of about 33°; potatoes, 40°; squashes, 52°. A lantern or small kerosene stove may be needed in the storage room in extremely cold weather to keep the frost out.

Small Fruits.—The raspberry plantation should be looked over, and if any canes have sprung up from the covering they should be laid down if the ground is not frozen. Should the covering have blown from the strawberry bed, put it back and throw a little soil, poles, or brush upon it to keep it in place.

Poultry.—The great secret of success in producing eggs in winter is to have a warm house where the fowls can retire to feed and roost. They must have fresh air even if it is cold, and must have an abundance and variety of food. The days are short and the fowls should be started early in the morning by giving whole grain in the litter and fresh water. The warm mash may be given at morning or night, if the dry mash is not found satisfactory.

Bees.—Little can be done for the bees at this time, except, if out of doors, to see that the opening in front of the hive is not closed by ice, and the bees smothered.

1

2

INDEX

	PAGE		PAGE
Annuals.....	109-110	Dairying.....	257-260
Apples.....	135, 138, 150-155, 243	Deciduous trees.....	75-77, 87
harvesting.....	151	December, routine work for.....	315-317
keeping.....	151-152	Decorating home grounds.....	78
shipping.....	152-153	Drainage.....	18-19
varieties.....	150	Drives.....	80-82
pests.....	153-154	Dwarf apple-trees.....	154-155
Apple trees, cost of.....	141	Eggs.....	241, 252, 254
in turf.....	141	Equipment for fruit-growing.....	131-134
Apricots.....	179-180	Evergreens.....	75-76, 86, 89
April, routine work for.....	285-288	February, routine work for.....	275-280
Arbors.....	95	Feed for cows.....	258
Asparagus.....	220-222	Fences.....	97
Asters.....	106	Ferns.....	106
August, routine work for.....	300-303	Fertilizing.....	125-126, 191, 239
Barn.....	44	Fires, wood.....	69
Beans.....	222-223	Flower garden, the.....	110
Bees.....	267-269	Flowers upon the lawn.....	102
Beets.....	223	Fodder.....	257
Biennials.....	114	Fruit growing.....	130-155
Blackberries.....	198-202	Fruit trees.....	88
Brick houses.....	61	in turf.....	123-124
Brooders.....	249	Furnace heat.....	70
Building Associations.....	52	Garden, the.....	117-129
Buildings, of a country home.....	22-23	plans for.....	119-121
made tight and warm.....	45	Gardening as a business.....	15
Bulbs.....	113, 115	Glass structures.....	217-218
Bush fruits.....	198-215	Gooseberries.....	205-206
Cabbages.....	223-225	Grading.....	79
Calendar of routine work.....	270-317	Grafting.....	144-147
Calves.....	263-265	Grapes.....	182-197
Capital required for a country		cuttings.....	183
home.....	29	girdling.....	193
Carriage-house.....	44	pruning.....	187-190
Carriages.....	266	marketing.....	192-193
Carrots.....	227	varieties.....	192
Cauliflowers.....	225-226	pests.....	194-197
Celery.....	227-230	Grasses.....	99
Cement.....	65, 68	Greenhouses.....	218
mixing.....	83	Gutters.....	35
Cement concrete houses.....	61-67	Hardy herbaceous perennials.....	113-115
Cherries.....	137, 180-181	Harnesses.....	266
marketing.....	181	Harrows.....	131
varieties.....	181	Heating.....	69-72
pests.....	181	Hedges.....	93
Climbers.....	96	Herbaceous plants.....	110
Cold frames.....	126-128	Hives.....	268
Colony-house for poultry.....	242	Hoes.....	125, 132
Concrete walks and drives.....	82	Home-seeking.....	16-30
Corn, sweet.....	230-231	Honey.....	268
Cows.....	257, 264	Horse power.....	134
breeds of.....	259-260	Horse, the family.....	264-266
Cultivators.....	131	Hot-beds.....	126-128, 218
Currants.....	202	Houses of wood.....	55-57
varieties of.....	204	of stone, brick, or cement.....	58
pests.....	204-205	Hybrids.....	180